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REGIONAL AIRPORT PLAN



MTC

Metropolitan Transportation Commission

 **ABAG**

ASSOCIATION
OF BAY AREA
GOVERNMENTS

Summary Report

M.W.S.



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REGIONAL AIRPORT PLAN

Summary Report

Prepared for the Regional Airport Planning Committee

April, 1980



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**Consultants Assisting in the
Regional Airport Plan Update Program**

<u>Consultant</u>	<u>Tasks</u>
Association of Bay Area Governments	<ul style="list-style-type: none">● Airport Employment Projections and Impacts● Air Quality Analysis● Airport Noise Impact Assessment● Environmental Impact Report
California Department of Transportation	<ul style="list-style-type: none">● Airport Employee Survey● Inventory of Ground Access Facilities and Services● Analysis of Ground Access Capacity● Analysis of Highway Congestion● Truck Traffic Forecasts● Airport Parking Requirements
Hodges and Shutt/Aviation Planning Services	<ul style="list-style-type: none">● Air Cargo Forecasts● Aircraft Operations Forecasts● Aircraft Operations Input to Noise Model● Airport Capacity Analysis
Peat, Marwick, Mitchell & Company	<ul style="list-style-type: none">● Airspace Capacity Analysis
The Parry Company	<ul style="list-style-type: none">● Noise Model Calibration● Noise Model Projections
The Transpo Group	<ul style="list-style-type: none">● Potential Diversion of Passengers to Future Rail Modes● Air Passenger Mode Split Model
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ADDENDUM

On October 22, 1980 the Metropolitan Transportation Commission (Commission) adopted the airport revisions to the Regional Transportation Plan and certified the EIR for the Regional Airport Plan. As a result of this action, the following have been incorporated in the Regional Airport Plan:

1. The recommendations from the North Bay Aviation Study--adopted by the Regional Airport Planning Committee on July 30, 1980--relating to the North Bay Airports are incorporated in the Regional Airport Plan.

Short Range Need

- o The North Bay should play a larger role in relieving general aviation traffic around the region's commercial airports in conjunction with capacity limitations where required.
- o The primary reliever general aviation airport role should be shared by Hamilton AFB, Napa County, Sonoma County and Nut Tree airports, with local government permitting only compatible land use around these airports.
- o Hamilton AFB and Napa County Airport have the greatest potential to relieve general aviation congestion around San Francisco and Oakland airports; Sonoma County and Nut Tree airports (Travis AFB is not available for reliever use) will provide relief by serving local training demand; and these four airports should permanently be limited to general aviation.
- o Funding priority in the North Bay shall be given to general aviation airports and their related access facilities serving a reliever role and having a full Instrument Landing System (ILS) that is compatible with at least 50% of the normal air traffic pattern.
- o Responsible agencies look into management techniques at existing airports to control noise and improve capacity. An off-airport terminal in the North Bay could improve transit use to existing airports.

Long Range Need

- o Review need for California Corridor service and/or regional airport (international and interstate airline service) at Travis AFB or a new airport in ten years, and encourage local government to permit only compatible land uses around Travis AFB.

2. Objective 1.9 on Page 40 is amended to read

RAPC shall comment on any airport's expansion in that airport's permit process, especially as to the desirability of the project in relationship to regional airport needs and to the suitability of the site of the expansion as compared to alternatives.

3. Plan Implementation Policy 1.1 on page 41 is amended to read.

The Regional Airport Plan (RAP) shall guide the Commission in its review of airport plans and development proposals.

4. Plan Implementation Policy 1.5 on page 41 is deleted.

5. Airport Noise Policy 1.5 on page 42 is amended to read

Airport noise abatement plans shall specifically consider the need to mitigate loud single events, particularly those occurring in the late evening.

6. Airport Noise Policy 1.8 on page 42 is amended to read

Noise insulation and noise easements shall not be used as a means to achieve compliance with the State's noise standards for large new developments in proximity to existing or proposed airports.

7. Airport Noise Policy 1.9 on page 42 is amended to read

Legislation that would substantially delay the Federal compliance schedule for retirement of aircraft that do not meet FAR Part 36 noise certification standards shall be opposed.

8. Airport Noise Policy 2.0 on page 43 is amended to read

Air traffic routings and procedures shall place a high priority on reducing aircraft noise including "overflight" noise at higher altitudes. Changes in flight procedures that result in a shift in noise levels from one part of the Bay Area to another shall be coordinated with regional agencies and local jurisdictions.

9. Airport Noise Policy 2.1 on page 43 is deleted and Policy 2.2 becomes 2.1.

10. Paragraph "c" on page 78 is amended as follows:

Santa Clara County update the Master Plans for Palo Alto, Reid-Hillview, and South County Airports and consider potential joint use of Moffett Field NAS in its plans. Such consideration of joint use of Moffett Field should include both the environmental and economic consequences of that action.

11. Further, the Commission made the following edits to the North Bay Aviation Study Final Report (July, 1980): Page IV-51 is corrected to read

Such federal concerns are just now being understood via experience learned at other airports...

12. Page IV-61, paragraph 2, is amended to read

There have been recent changes to local land use policies for Hamilton AFB resulting in incompatible residential development being located within noise impact boundaries and which provide for industrial/commercial development that is potentially incompatible from a safety standpoint.

AIR CARRIER AIRPORTS

I. INTRODUCTION

Background

Air transportation provides a vital link between the San Francisco Bay Area and other parts of the country. Despite cyclical fluctuations, passenger and cargo traffic continues to increase. Additional demands on the regional airport system will present major challenges: the need to develop and finance new airport facilities, the need to minimize airport noise and air pollution, and the need to conserve energy. These challenges will require new ways to expand and operate airports and to manage the development of airline service.

Because many issues concerning airport expansion are regional in nature, the Association of Bay Area Governments (ABAG) and the Metropolitan Transportation Commission (MTC) have prepared a plan to guide future aviation growth in the nine-county San Francisco Bay Area.

Preparation of a regional airport plan began in the late 1960's. The original Regional Airport System Study (RASS) was adopted in 1972 after extensive public hearings. Revisions were later made to the plan, particularly in the area of the demand forecasts. These revisions are currently incorporated in the Airport Element of MTC's Regional Transportation Plan and ABAG's Regional Plan.

After several years, it became evident that the original plan needed to be updated. The Regional Airport Plan Update Program (RAPUP), conducted under the auspices of the ABAG/MTC Regional Airport Planning Committee (RAPC), was funded by the Federal Aviation Administration for this purpose. Included in the current planning program is a revised Environmental Impact Report for the recommended plan.

Reasons for Revising the Plan

The airport system plan needs to be revised to provide a more useful and effective policy tool for ABAG and MTC in making decisions concerning airport and airline service development. It needed to:

- reflect current information regarding aviation growth
- clarify and emphasize various environmental issues, such as noise, air quality, and energy conservation
- reflect the results of recent airport planning studies including the Oakland Airport Master Plan, the San Francisco/San Mateo Joint Land Use Study, and the San Jose Airport Master Plan and Vicinity Area Plan.

The update study, therefore, focuses on these matters, giving particular attention to the development of policies that correctly reflect the regional agencies' role in airport planning.

Effectiveness of Past Plans

Despite the laudable goals in the regional plan, implementation of the policies and recommendations has proved difficult because it relies almost solely on the persuasive powers of the regional agencies to get airlines, airports, and Federal, State and local government to agree to the recommendations. The greatest drawback of past plans is that the policies have required compromises that are greater than any of the participants are willing to make.

One of the major lessons to be learned from past experience is that a clear strategy is needed for relating policies with their method of implementation. Those policies that are readily agreeable to all agencies involved in airport planning can be implemented through cooperative methods. On the other hand, controversial policies that are not expected to gain cooperative support should have a clear statement as to how they could be carried out.

What Will the Plan be Used For?

The plan provides the policy by which ABAG and MTC make decisions in the following areas:

1. Conformance of Local Plans and Projects with the Regional Airport Plan
 - Airport Master Plans
 - Airport Land Use Commission Plans
 - Local Government General Plans
 - Airport Development Projects
 - Environmental Impact Reports
 - Ground Transportation Facilities and Services
 - Housing and Land Use Projects
2. State and Federal Actions Affecting Airport Development
 - Allocation of Funds to Airports
 - Airline Routes/Adequacy of Service
 - Disposal of Military Airports
 - Variances from the State Airport Noise Standards

3. State and Federal Legislation Affecting Airport Planning

- Airport and Airways Development Act (Funding)
- Federal Aviation Act (Deregulation)
- Airport Land Use Commission Reform
- California Transportation Plan Policies
- Federal Aviation Noise Policy
- Federal Energy Policy

II. FINDINGS

In the late 1960's the Association of Bay Area Governments (ABAG) and the three regional airports began studying the need for future aviation facilities in the San Francisco Bay Area. The Regional Airport System Study (RASS) Committee was subsequently formed, consisting of an elected official from each of the nine Bay Area counties and representatives from the three airports. The purpose of the Committee was to develop policy and make final recommendations. Their work culminated in 1972 in an adopted plan. Additional work has taken place since that time to keep the plan current and to implement its recommendations. The inclusion of an aviation element in the Metropolitan Transportation Commission's (MTC) Regional Transportation Plan is now mandated by State law.

The need for a regional overview of airport planning has long been apparent. The use of Bay Area airspace is already "managed" by a quasi regional agency, in this case the Federal Aviation Administration's Terminal Radar Approach Control Facility, since aircraft operations at one airport interact with operations at other Bay Area airports. Several other factors are also relevant:

- Airports in the Bay Area serve a broad regional demand for passenger and cargo service extending well beyond the immediate jurisdiction of the airport operators.
- Noise from aircraft landings and takeoffs and from aircraft "overflights" affects a large number of Bay Area communities. Certain communities have borne the major effects of the growing regional demand for air transportation simply because they are located near the airports.
- Emissions from aircraft and automobiles affect regional as well as local air quality.
- Ground transportation improvements often involve coordination among more than one political jurisdiction. The programming of funds for highway and transit improvements takes place at the regional level.
- Conservation of energy has emerged as a major goal in transportation planning. How new airline service is developed in the region will have a significant impact on the consumption of transportation energy both on the ground and in the air.
- Airport expansion has historically resulted in some filling of the Bay. Protection and enhancement of the Bay as one of the region's most significant environmental resources is an important concern.

The purpose of the current Regional Airport Plan Update Program (RAPUP) is to review each of the criteria used in developing the recommended airport system plan, to make the plan more explicit with respect to mitigating adverse environmental impacts, and to make the plan more useful for implementing regional policy. The policies and recommendations will be used to revise the Airport Element of the Metropolitan Transportation Commission's Regional Transportation Plan and the Association of Bay Area Government's Regional Plan. The Joint ABAG/MTC Regional Airport Planning Committee (RAPC), an advisory committee to ABAG and MTC, is responsible for guiding the study and formulating the final recommendations.

The Regional Airport System

Regional aviation demand is served by San Francisco, Oakland, and San Jose Airports. (See Figure II-1)

CURRENT AIRPORT ACTIVITY LEVELS

<u>Airport</u>	<u>1979 Passengers*</u>	<u>1979 Cargo** (Thousands of Tons)</u>
San Francisco International	22,600,000	485,000
Oakland International	2,700,000	12,100
San Jose Municipal	3,600,000	10,900
Regional Total	28,900,000	508,000

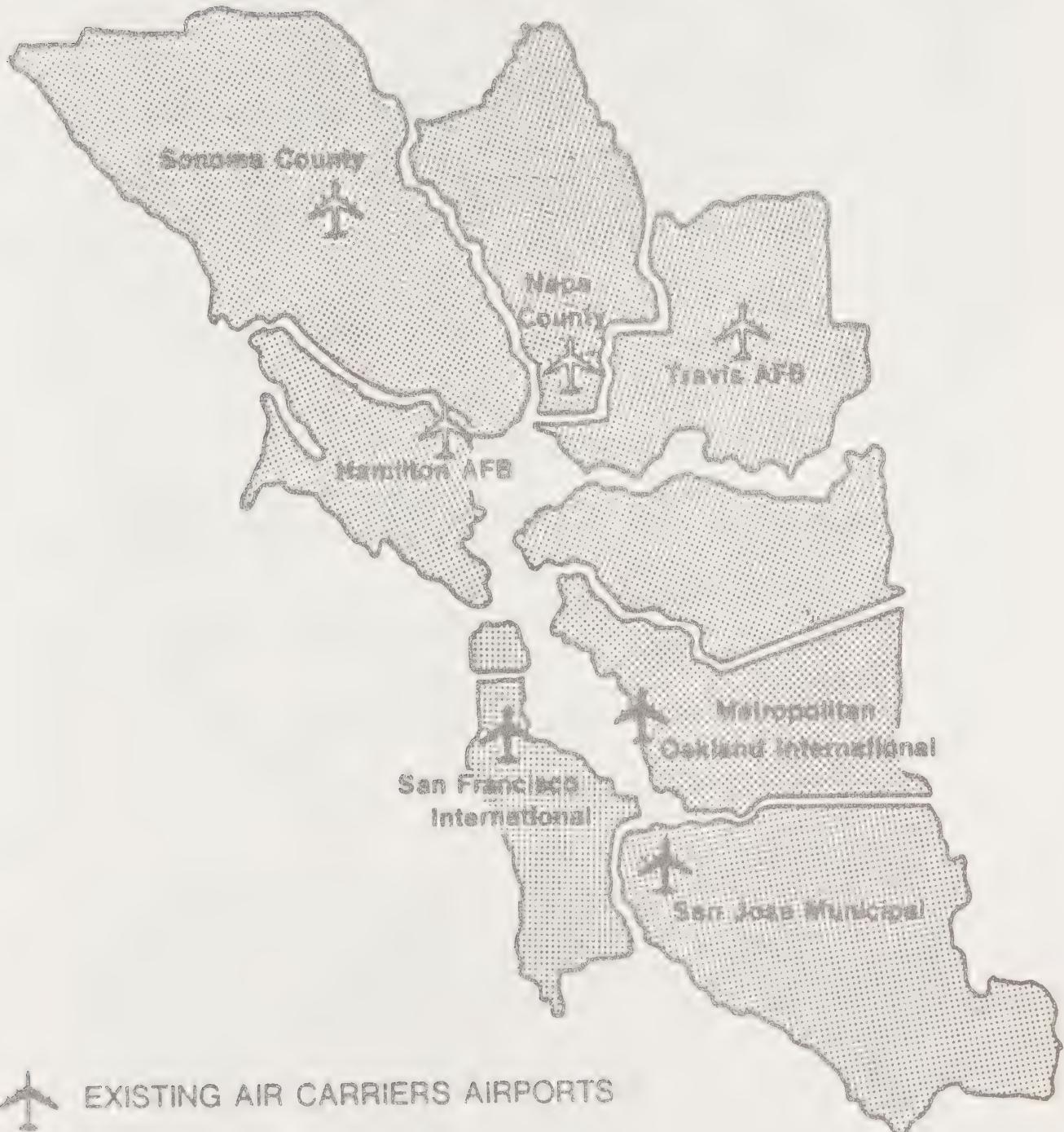
*Excludes estimated "through" passengers

**Includes air freight and air mail

The San Francisco Bay Area is the fifth most active airport "hub" in the United States behind Chicago, New York, Atlanta, and Los Angeles. San Francisco Airport, the region's major airport, handles 78% of the passenger traffic and almost all of the air cargo. International service as well as a significant portion of domestic service is located at San Francisco Airport. Private investment in passenger service facilities, aircraft service facilities and air cargo facilities is substantial.

Oakland Airport's share of Bay Area passenger traffic averages between 9% and 10%. Oakland's activity rose sharply in the late 1960's when intrastate carriers inaugurated new service in California markets. Between 1965 and 1969 there was also rapid growth in service to Europe and Hawaii by supplemental air carriers headquartered at Oakland. This service subsequently declined in the early 1970's as scheduled carriers introduced competing low group fares. Development of new interstate service has fluctuated with the economy and airline profitability.

Figure II-1
BAY AREA AIRPORTS



EXISTING AIR CARRIERS AIRPORTS

POSSIBLE FUTURE AIRLINE SERVICE POINTS
FOR CALIFORNIA CORRIDOR

San Jose Airport's share of Bay Area passenger traffic is about 12% and has been gradually increasing on the strength of economic and population growth in the South Bay and new airline service. Like Oakland, San Jose's development received a major impetus in the late 1960's with the inauguration of new intrastate service. The airport has been somewhat more successful than Oakland Airport in attracting and retaining new interstate service.

Overview

The regional airport plan must meet a broad range of objectives. These include providing a convenient and safe air transportation system to serve future demand as well as minimizing adverse effects of aviation growth such as increased aircraft noise and air pollution. While the concept of a regionally planned air transportation system is attractive, the historic objective of dispersing airline service among the Bay Area airports has not been achieved, largely for economic reasons. Thus the environmental benefits of the regional plan, particularly with respect to noise reduction, have been indefinitely postponed.

Other multiple-airport hubs across the country have experienced similar difficulties in fostering traffic development at underutilized airports. The reasons for this are discussed below.

- **Magnitude of Private Investment** - Existing and future financial commitments by the airlines at San Francisco Airport are substantial. Duplication of services and facilities at other airports increases airline costs. Airline policy, in general, is to develop new facilities when existing facilities become saturated. Thus, the major expansion and modernization program under way at San Francisco will have a continuing impact on development at other Bay Area airports for a number of years.
- **Economics and Fuel** - During periods of moderate economic growth and healthy airline profits, service has increased at Oakland and San Jose. During periods when fuel is scarce and the economic outlook worsens, marginal flights are cancelled in favor of concentration of service at larger airports. Continuing airline investment in bigger aircraft will also tend to concentrate service at the major hub airports where higher passenger loads can be obtained.
- **Regulation** - The regulatory framework has not worked in favor of the regional plan. Extensive "co-terminal" and "hyphenated" authority existed for a number of years prior to the passage of the Airline Deregulation Act in 1978. Under this type of authority Oakland and San Jose were often listed on the same route certificate as San Francisco, and service to San Francisco fulfilled an airline's obligation to serve the other Bay Area airports.
- **Regional Powers** - Regional authority over the development of the airport system is restricted to the review of projects for consistency with the regional airport plan. MTC statutes require a

finding of consistency for a project to be approved. However, a fundamental problem is that regional actions influence facilities but not service. While building airport facilities can provide the potential for increased service, the construction of a new terminal at Oakland, for instance, will not itself produce any more service.

Conversely, a restraint on development at San Francisco will not necessarily encourage passengers or airlines to use other airports; rather this condition may merely increase congestion and inconvenience to an intolerable level. Thus the use of facilities to manage growth is an imprecise method at best. (The statutory powers of the MTC have, however, been used to condition approval of airport funding applications when mitigation measures for noise, air quality, or surface traffic were clearly lacking or inadequate.)

In an attempt to develop better airline service at Oakland, the ABAG/MTC Regional Airport Planning Committee became a party to the Oakland Service Case. Initiated in April, 1977, by the Port of Oakland, the service case requested the Civil Aeronautics Board (CAB) to grant new or improved service to Oakland in 22 specific markets and to suspend the "dormant" or unused authority of those carriers who were certificated to serve the Oakland markets but had not chosen to do so. The CAB responded by making the Oakland case a test case for a major change in regulatory policy called multiple permissive authority. Rather than selecting carriers for specific routes, all carriers who met the "fitness" criteria were presumed capable of service and were granted authority.

While the major thrust of the Oakland case was to develop new authority specifically to Oakland, the subsequent passage of the Airline Deregulation Act of 1978 led to a broad reshuffling of corporate strategies and airline routes. This Act essentially eliminated many of the incentives for new carriers to "Fly Oakland," although it did contain a policy calling for development of satellite airports.

- **New Ideas** - Under the sunset provisions of the Airline Deregulation Act, the CAB will gradually go out of business, first abandoning its authority over routes (in 1981) and then over fares (in 1982). This Act offers little opportunity to work through a regulatory framework to achieve regional objectives.

Instead, other more contemporary strategies must be studied and tried. In its discussions with RAPC and the Bay Area airports, the CAB has supported the use of economic incentives to obtain overall regional goals. For instance, airport fees could be set high at one airport and lower at another airport to promote the use of the underutilized airport. This approach would require the renegotiation of existing airport/airline agreements to permit higher fees and/or charges.

Another concept has to do with the "slotting" of traffic to one or more airports. Airline "slot" committees exist at certain congested airports in the country to allocate the use of airspace during critical hours of the day. This approach could be used on a regional scale to affect more efficient utilization of airport and airspace capacity and to reduce regional airport noise exposure. The method used to allocate airport slots would be critical since both the CAB and the Federal Aviation Administration (FAA) have expressed concerns over systems that are discriminatory or anti-competitive or that place an undue burden on interstate commerce.

One of the major issues that needs to be addressed is the institutional framework for implementing any of the strategies discussed above. In particular, actions by individual airport operators acting collectively for the benefit of the whole (read Bay Area) may be considered anti-competitive, while similar actions by an authority or district might be legally acceptable.

The Study Approach

The Committee's review of the regional airport plan focused on two principal areas of concern; the evaluation of future airport system alternatives, and the analysis of potential mitigation measures. An airport system alternative represents a specific distribution or "allocation" of passenger traffic among the Bay Area airports for future years. An alternative defines the type of service at each airport, the location of passengers that use the airport, the number of aircraft flights, and the amount of surface traffic. These factors in turn are used to calculate regional effects associated with airport system capacity, airport noise levels, air pollution, and energy consumption. Mitigation measures for airport noise, air quality, and energy consumption were combined with different airport system alternatives (which have their own inherent "system" mitigation capabilities) to determine the effectiveness of existing and proposed regional policies.

o Past Airport System Alternatives - The formulation of airport alternatives for this study is the result of an evolutionary process that began in 1969 with the Regional Airport System Study (RASS).

In 1970, the RASS Committee proposed eleven alternative combinations of airport sites and capacities to accommodate forecasted demand. The eleven alternatives included new air carrier airports at San Jose (Site E), Hamilton, Concord, Livermore, Travis AFB, Sonoma County, Richmond, Napa County, and Hollister. To the original list was added a mid-Bay airport, a new airport in eastern Contra Costa County, and a new airport in Marin County. As a result of the public response to these alternatives, the RASS Committee removed the following airports from active consideration for air carrier use:

- Hollister
- Site E
- North Bay
- Mid-Bay
- Richmond
- Concord
- Livermore
- Lakeview Road (Sonoma County)

The recommended plan placed a policy limit on San Francisco Airport of 31 million annual passengers for capacity and environmental reasons. Oakland Airport was recommended as the airport to serve a major share of new demand in the region. Oakland Airport was assumed to have a second parallel runway which would be constructed in the Bay and would nearly double the airport runway capacity. A second parallel runway, to be constructed in the Bay, would nearly double the airport runway capacity. Oakland's advantages were its accessibility and over-water takeoffs and landings, which minimize noise perceived by nearby residents; its disadvantages, the Bay fill required for the second runway.

San Jose, in the midst of high South Bay population expectations, put a lid on its airport at around 10 million annual passengers for environmental reasons. Much of the demand generated in that area then would have to go to San Francisco and Oakland.

Travis AFB presented the problems of a remote site. Most people would not choose to travel to Travis AFB unless unique service were placed there. Capital costs for access and terminal facilities for a major airport at this site would be large.

Napa or Hamilton was slotted to meet the local need of the northern counties for California Corridor service rather than to serve as a major regional airport. Capacity in this role would be for about one million passengers annually at either one or the other, but not both. Local sponsorship or veto would be the controlling factor in the selection. (See Figure II-1)

Thus the recommendations became:

RECOMMENDATIONS FROM REGIONAL AIRPORT SYSTEM STUDY (RASS)
(Millions of Annual Passengers)

<u>Airport</u>	<u>1975</u>	<u>1980</u>	<u>1985</u>
San Francisco	19	23	31
Oakland	6	13	24
San Jose	3	6	10
Travis	0	1	6
Napa or Hamilton	0	1	1
TOTAL	28	44	72

- **Current Airport System Alternatives** - Current demand projections and past policy decisions limit the scope of the airport system alternatives that were reviewed. Two major assumptions have been made with respect to the development of the regional airport alternatives:

- 1) Maximum use shall be made of existing airports in accommodating projected levels of demand.
- 2) Development of a new regional airport in the Bay Area is not feasible because of the magnitude of the costs and the difficult environmental issues that would have to be faced.

Several other developments have a bearing on the airport system alternatives. First, after several years of study, the City of San Jose dropped from further consideration the possibility of developing an entirely new airport to replace the existing air carrier facility. Second, MTC and Solano County completed a study to determine the feasibility of joint civilian-military use of Travis AFB. Third, Hamilton AFB was declared surplus by the federal government in 1976 and is being disposed of by the General Services Administration for possible aviation use.

The airport system alternatives defined for this study are relatively subtle compared to earlier alternatives. They primarily focus on traffic adjustments within the existing system of airports. However, the impact of the traffic allocations on a single airport, such as Oakland or San Jose, will be substantial because of the relatively low level of current activity. In addition the concept of a North Bay airline service point for limited intrastate service involves local and regional policy issues that are as sensitive as any of the issues explored in the original study.

The major differences between the alternatives defined for the study are discussed below (See Figures II-2 and II-3 for projected airport passenger volumes):

- Alternative 1. Existing Airport Shares. Alternative 1 provides the "basecase" with which to compare proposed reallocations of traffic among Bay Area airports. In this alternative it is assumed that each airport maintains its current share of traffic to the major air travel destinations. While there will be some changes in the relative traffic growth among these destinations and in the distribution of air passengers within the region, these changes will not have a significant impact on projected traffic shares. Passenger and cargo service would continue to be concentrated at San Francisco Airport while Oakland and San Jose Airports would serve in satellite roles handling between 10% and 12% of Bay Area traffic. There would be some interstate service at these airports, but most flights would be short-haul flights to destinations in and adjacent to California.

Figure II-2
1987 AIR PASSENGER VOLUMES BY ALTERNATIVE
(MILLIONS OF ANNUAL PASSENGERS)

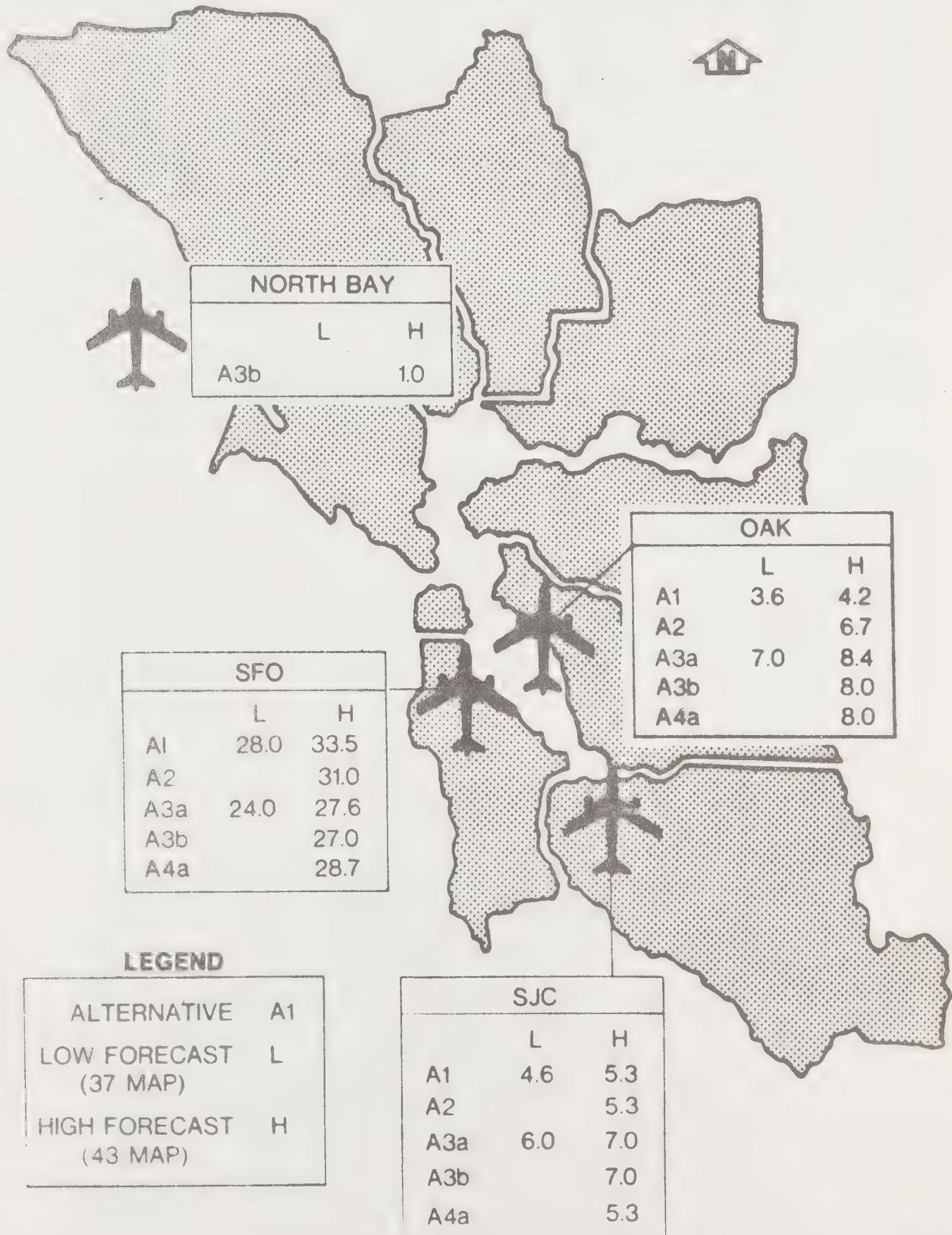
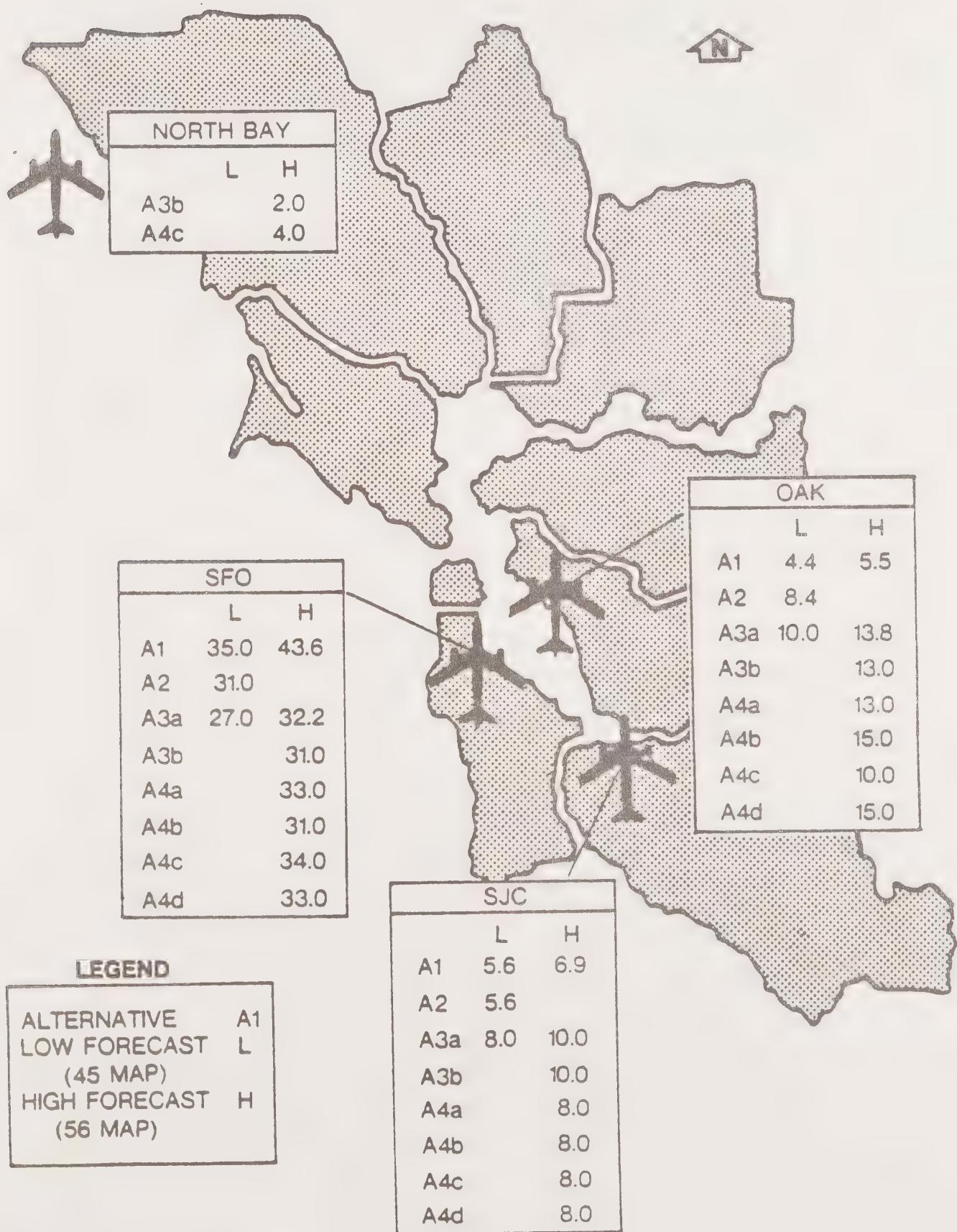


Figure II-3
1997 AIR PASSENGER VOLUMES BY ALTERNATIVE
(MILLIONS OF ANNUAL PASSENGERS)



While this alternative would generate the fewest number of flights and would be beneficial from an energy conservation standpoint, the concentration of service at San Francisco results in substantial and largely unacceptable levels of air and surface traffic congestion. Forecasted noise and air quality effects would be the most severe of any alternative.

- Alternative 2. Airline Plan. The airlines have expressed their airport development policy through various reports issued by the Air Transport Association. In essence airlines endorse the concept of utilizing San Francisco Airport to its fullest before major expansion takes place at San Jose or Oakland Airports. Emphasis would then be placed on expansion of Oakland because of its overall potential for meeting long-range demand. Requirements for more terminal space, saturation of ground access facilities, and increasing runway and airspace delays at San Francisco would presumably provide the initial impetus for carriers to switch flights to Oakland. The "saturation" level has been assumed to be 31 million annual passengers. It was further assumed that traffic levels at San Jose Airport would remain the same as in Alternative 1.

Some ground access improvements would be required at Oakland and the terminal would need to be expanded. It is assumed that "new" Oakland demand represents East Bay air travelers who would normally have used San Francisco Airport.

Compared to Alternative 1, Alternative 2 will generate a larger number of Bay Area flights but will reduce negative regional noise and air quality effects due to 1) greater utilization of Oakland, with its overwater approaches and departures, and 2) reduced airport ground access distances resulting in lower auto emissions.

- Alternatives 3a and 3b. Regional Airport Plan. Alternatives 3a and 3b represent the current proposal in the adopted Regional Transportation Plan. Oakland and San Jose would serve a substantial portion of the projected air travel demand within the areas most accessible to these airports. (Oakland Airport's service area would include downtown San Francisco in order to match traffic levels to the policy recommendations adopted by RAPC.) Under this alternative, projected demand would support service between Oakland and San Jose airports and various medium-to long-range destinations such as Chicago, Denver, Atlanta, Phoenix, Dallas/Ft. Worth, Minneapolis-St. Paul, New York, Washington D.C., and Hawaii. Some service would continue to be provided solely at San Francisco Airport because of insufficient demand at Oakland and San Jose

Airports. At 13 million annual passengers, Oakland's traffic could still be accommodated on a single runway. San Jose would serve 10 million annual passengers in 1997.

Alternative 3 has been further divided into Alternatives 3a and 3b in order to quantify the tradeoffs associated with a North Bay airport. Alternative 3a expands service at Oakland and San Jose but does not include a North Bay Airport. Alternative 3b adds the North Bay airport, which would serve up to 2 million annual intrastate passengers in 1997. Projected demand for the four North Bay airports is shown below.

PROJECTED NORTH BAY AIRPORT DEMAND

(Annual Passengers)

Airport	1987		1997	
	Low	High	Low	High
Hamilton	978,900	1,137,600	1,451,600	1,806,000
Sonoma County	546,300	634,900	845,600	1,052,200
Napa County	688,000	799,500	1,078,200	1,341,700
Travis AFB	305,000	355,500	519,600	646,600

Note: This demand was determined solely on the basis of projected travel demand in the Southern California market and on the basis of accessibility of the North Bay airports relative to San Francisco and Oakland airports.

The distribution of Bay Area demand in Alternatives 3a and 3b would provide a more rational and convenient system from the user's standpoint. Total regional noise exposure and air pollution would be minimized. Energy consumption would be minimized with respect to aircraft delays and ground access, but total energy consumption (including energy consumed by aircraft in flight) would be higher than either Alternative 1 or 2.

- Alternatives 4a-4d. San Jose Airport Constrained. For both physical and environmental reasons, the regional policy allocating up to 10 million annual passengers at San Jose in 1997 needs to be carefully reviewed. Alternative 4 consists of a range of options to "reallocate" 1.7 - 2.0 million annual passengers to other Bay Area airports. These alternatives are designated 4a-4d. In Alternative 4a, the overflow is absorbed at San

Francisco Airport. Alternative 4b accommodates the overflow at Oakland Airport. A North Bay airport is expanded in Alternative 4c in order to relieve both San Francisco and Oakland Airports and limit their activity to 31 and 13 million annual passengers, respectively. (Prior to this alternative, only California intrastate service has been considered at a North Bay airport. Travis AFB was identified in the earlier study as a potential site to handle regional overflow because of its runway and airspace capability and compatibility of surrounding land use.) In contrast to the preceding alternatives, Alternative 4d assumes that all of the overflow from San Jose is absorbed at existing airports, raising the regional policy limits for San Francisco and Oakland Airports to 33 and 15 million annual passengers respectively. It also eliminates the North Bay airport.

- **Mitigation Measures.** Extensive experience in reviewing airport expansion programs indicates a need to reformulate regional policy in several areas. In some cases new policies have been developed during the course of the regional update study. For instance, regional policy now calls for the development of airport ground transportation improvement, noise abatement, and air quality improvement programs by the airport operators when major expansion is anticipated. This policy clearly focuses attention on potential mitigation actions such as the following:

- **Noise Abatement**

- Replace or retire all aircraft that were manufactured prior to the establishment of aircraft noise certification requirements (Federal Aviation Regulations, Part 36)
- Limit number of aircraft operations;
- Limit number of aircraft operations in late evening;
- Limit aircraft operations in late evening to newest technology aircraft;
- Prohibit operations by Super Sonic Transports unless they meet Part 36.

- **Ground Transportation**

- Increase percentage of air passengers and airport employees using airport transit services to 25%;
- Increase percentage of airport employees using carpools/vanpools to 25%;
- Reduce "Kiss-and-Fly" trips by providing more long-term parking for resident air passengers.

- **Air Quality**

- Reduce emissions from aircraft engines;
- Reduce emissions from automobile engines;
- Implement ground transportation recommendations above;
- Tow aircraft to runways or shut down one or more engines when taxiing to runways.

- **Energy**

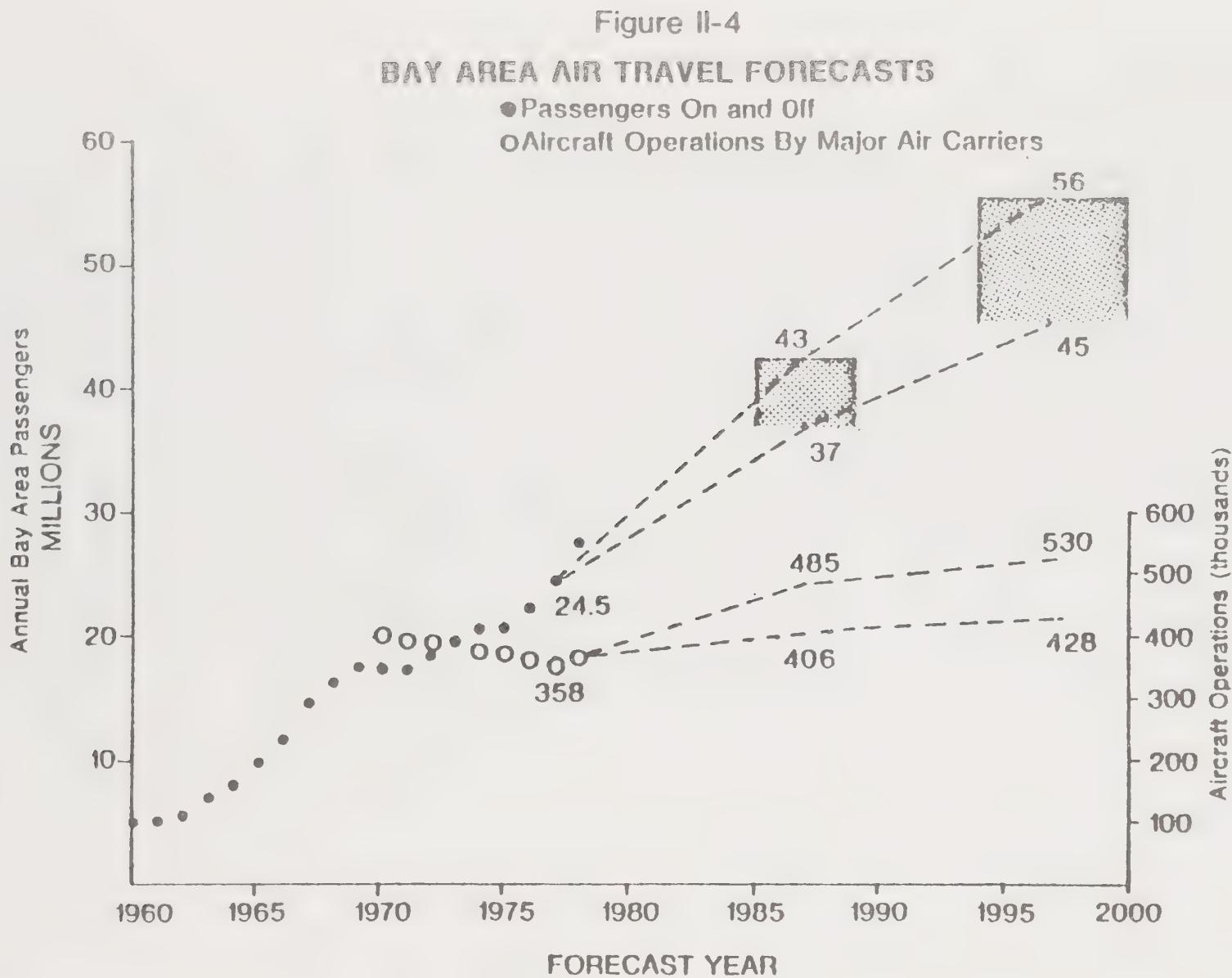
- Maintain high airline passenger load factors;
- Retire less fuel-efficient aircraft and replace with newer technology aircraft or re-engine older aircraft;
- Reduce fuel consumption of automobiles;
- Implement ground transportation recommendations above;
- Achieve higher load factors for trucks picking up and delivering air cargo.

Estimates of Future Aviation Activity

One of the most difficult tasks in airport planning is to determine the most likely rate of growth in air passenger and air cargo activity. Public debate on this single issue has been extensive. Earlier forecasts based on traditional assumptions concerning air fares, economic growth, and regional demographic patterns have had to be incrementally adjusted to account for such factors as fuel shortages, major recessions, and new federal policy on airline deregulation. These factors could ultimately have wide-ranging effects on the need for new airport facilities, compliance with the State's airport noise standards, and compliance with State and Federal air quality standards.

The Regional Airport Planning Committee significantly reduced the original RASS forecasts in 1975 and has reviewed the forecast trends and assumptions on two subsequent occasions. The forecasts below are based on the best thinking of the Committee at this time. (See Figure II-4)

The high passenger forecast assumes: (a) a healthy economy with GNP growing above historic rates, b) a continuation of airline low fare promotional programs, and c) a significant increase in fuel supplies for the airline industry to support future service development. In comparison, the low forecast assumes: a) moderate growth in GNP, b) a rate of decline in "real" air fares that is more like pre-airline deregulation experience, and c) a constant or only modest increase in the supply of fuel. Passenger forecasts represent a 4.2 to 5.8% annual growth rate over the next 10 years and a 3.1 to 4.2% annual growth rate over the full 20 year span.



CURRENT FORECAST RECOMMENDATIONS

(Annual Activity)

Year	Forecast Range	Bay Area Passengers	Air Cargo (Tons)	Aircraft Operations	Passengers/Operation	Commuter Operations
1977		24,465,000	490,000	358,000	73.5	62,000
1987	Low	37,000,000	790,000	406,000	92.0	43,000
	High	43,000,000	838,000	485,000	98.3	85,000
1997	Low	45,000,000	1,284,000	429,000	109.0	68,000
	High	56,000,000	1,784,000	532,000	119.0	110,000

Passengers using the Bay Area airports to transfer between flights will decrease to 13.5% of total Bay Area traffic in 1987 and 12.0% in 1997 (compared to an estimated 15% in 1975).

Air freight tonnage will increase at a rate of 6%-8% annually. The "gateway" location of San Francisco for the rapidly industrializing nations in Asia and the Pacific will be a strong influence on cargo growth. Business and personal mail will increase at a rate comparable to the increase in employment and population in the region; the volume of peacetime military mail will be relatively constant.

Aircraft operations (takeoffs and landings) by major airlines will increase at a much slower rate than passenger and air cargo activity. Airlines will purchase larger aircraft and increase load factors. Although there will be no major technological breakthroughs similar to the introduction of the wide-body aircraft, the DC-9 derivatives and new B757/B767 aircraft entering airline fleets in the early to mid-1980's will be significantly quieter and more fuel-efficient than earlier aircraft. Advanced versions of the DC-10 and L 1011 wide-body aircraft will also incorporate new fuel saving and noise reduction technologies.

The number of all-cargo airline operations will actually decline. All-cargo operations will generate between 8-10,000 flights per year with approximately 50% of the projected cargo tonnage being carried in the cargo holds of passenger aircraft.

Operations by Third Level air carriers (Commuter Airlines) will increase significantly under the Airline Deregulation Act. Prime candidates for third level carrier service include California communities such as Bakersfield, Modesto, Fresno, and Stockton, that have been deleted from the route system of the larger carriers. The impact on Bay Area airports receiving these activities could be significant in terms of airport and airspace capacity.

Evaluation of Airport and Airspace Capacity

The combined runway capacity of San Francisco, Oakland, and San Jose Airports will be sufficient to meet 1997 demand; however, aircraft

delays will increase. The amount of delay experienced will be influenced by the distribution of demand between the Bay Area airports and the amount of general aviation and Third Level airline activity. If service is concentrated at San Francisco, demand will exceed capacity at that airport and delays will be substantial.

AIRPORT RUNWAY CAPACITY

(Annual Aircraft Operations)

<u>Airport</u>	<u>Air Carrier Capacity</u>	<u>General Aviation Capacity</u>	<u>Total Capacity</u>
San Francisco	310-330,000	70-90,000	400,000
Oakland	144-170,000	14-40,000	184,000
San Jose	100-160,000	610-670,000	770,000

There will be sufficient runway capacity at all of the North Bay airports to serve the North Bay demand identified in the regional plan.

Present-day airspace capacity can be achieved only through the use of complex airspace routes and air traffic control procedures. The present system is also vulnerable to poor weather conditions and capacity is severely reduced during periods when Instrument Flight Rules (IFR) are required. (In IFR weather, approaches to San Francisco are limited to a single runway.) Fortunately, these conditions occur relatively infrequently--usually less than 8% of the year.

Aircraft are sequenced onto the final approach paths to the Bay Area airports by Bay Terminal Radar Approach Control (TRACON). Bay TRACON is the busiest approach control in the world and handled approximately 750,000 instrument flight rule operations in 1979. TRACON manages traffic at all three major air carrier airports as well as a number of smaller general aviation airports.

The airspace analysis considered the following set of conditions:

- 1997 levels of operations;
- IFR weather;
- West Plan operations;
- Peak arrival and departure periods.

The analysis showed airspace capacity would be increased about 40% if future traffic could be redistributed among the airports as proposed in the regional plan; however, even with traffic redistribution, there will be a systemwide deficiency in airspace capacity in 1997. This condition could be partially resolved by: a) limiting demand during peak periods, b) allocating additional demand to Oakland (theoretical Alternative X), or allocating additional demand to a North Bay airport (theoretical Alternative Y). Excess IFR demand could also be satisfied by construction of new runways at San Francisco or Oakland.

The analysis also suggests that critical airspace problems will appear much earlier than 1997 if the relative traffic distribution among Bay Area airports remains unchanged and activity by Third Level carriers continues to increase. An excess of demand over capacity manifests itself in the propagation of delays throughout the local and national air transportation system. When delays become large, the following effects are likely to occur:

- Cancellation of scheduled flights
- Delays at the origin airport for flights with destinations in the San Francisco Bay Area
- Diversion of arriving aircraft to airports other than their normal destination
- Reduced airspeed during the air route phase of flight
- Delays in holding patterns at points along the air routes
- Imposition of quotas on the maximum number of aircraft that can use the airports during peak hours.

Estimated airspace demand/capacity ratios are shown in the following table.

COMPARISON OF DEMAND WITH AIRSPACE CAPACITY

(Number of Flights - 1997 Arrival Peak)

Airport System Alternative	Overall System Demand	IFR Conditions Capacity	D/C	VFR2 Conditions Capacity	D/C
I	192	83	2.3	163	1.2
3b	192	117	1.6	231	0.8
X	192	154	1.3	308	0.6
Y	160	160	1.0	320	0.5

Notes: D/C = ratio of demand to capacity.

VFR2 = ceiling between 1,000 and 6,000 feet and/or visibility between 3 and 6 miles (13% of year).

IFR = ceiling less than 1,000 feet and/or visibility less than 3 miles (8% of year).

Evaluation of Airport Ground Access Conditions

Airports are dependent on an efficient regional and local ground transportation system to provide access for passengers, their friends and relatives, employees, cargo, and other traffic to the terminal areas. Of particular concern are the street and highway facilities adjacent to the airports, which experience the combined load of growing airport traffic as well as growing urban traffic. Because of the continuing shortage of capital funds for transportation improvements in the region, more productive ways will have to be found to use existing transportation facilities and services.

Major access problems at San Francisco Airport include freeway congestion south of the airport and internal circulation on the airport property.

Major access problems at Oakland Airport include constraints on local street capacity between the airport and the Nimitz Freeway and a gradual shifting of congestion northward and adjacent to the airport.

Major access problems at San Jose Airport include continuing congestion on all freeways surrounding the airport (particularly the Bayshore Freeway south of the airport) and poor access between these freeways and the airport terminal and parking areas. Another problem at San Jose Airport is the limited accessibility of the airport by transit.

The airport access analysis consisted of estimating airport surface traffic for each airport system alternative, assigning this traffic to specific access routes, and evaluating the impact of this traffic on facilities serving the airports. Because of the number of airport system alternatives and the range in regional demand for each forecast year, there is a potential for large variation in traffic at each airport. To the extent that traffic is shifted from congested portions of the regional transportation system to less congested portions, regional transportation flows will be improved (See Figure II-5). In general, considering both airport and non-airport traffic, the analysis indicates the potential for continuing and most likely increasing congestion during peak urban travel periods in the vicinity of all airports.

Although this statement may appear intuitively obvious, greater definition of the problem is elusive. Analysis of future capacity requirements must recognize the inherent dynamics of travel demand. Increasing congestion usually results in adaptive behavior on the part of users of the transportation system; that is, airport and non-airport tripmakers will tend to change access routes, modes of transportation, and/or travel schedules to minimize personal inconvenience and costs. Thus straightforward demand/capacity comparisons can be misleading.

The relative significance of airport traffic on the freeway segments adjacent to the airports is shown below as a percentage of freeway capacity used on the average day of the peak month (estimates include air passenger, airport employee, and "other" airport traffic - such as air cargo, airport service and maintenance vehicles, general aviation traffic, etc.).



Figure II-5
Nine-County
San Francisco Bay
Area Region
Recurrent Congested
Areas

HIGWAY NETWORK

Arterials/Major
Highways
Freeways

- Congested Location (one way)
- Congested Location (two way)

Data Courtesy Caltrans



COMPARISON OF DEMAND WITH FREEWAY CAPACITY

Airport	Access Route/Location	(Average Day of Peak Month)	Number of Lanes-Capacity*	Percentage of capacity used by Airport	
				1987	1997
San Francisco	101 - North of Rte. 380 Jct.		8-160,000	23-25%	26-41%
	101 - South of Broadway		8-160,000	23-30%	27-38%
	380 - West of Airport		8-160,000	22-26%	27-34%
Oakland	17 - North of Hegenberger		8-160,000	10-17%	13-28%
	17 - South of Davis Street		8-160,000	4- 7%	5- 9%
San Jose	17 - South of Coleman		6-120,000	7- 9%	8-11%
	17 - North of Brokaw		6-120,000	6- 6%	5- 7%
	101 - North of Guadalupe		6-120,000	4- 5%	5- 6%
	101 - South of Rte. 17 Jct.		6-120,000	9-11%	12-17%

* Capacity is number of vehicles per day in both directions.

Note: Implementation of the regional plan would result in the highest percentage of highway capacity being used at Oakland and San Jose Airports and the lowest percentage at San Francisco.

Airport expansion and development programs have historically failed to place sufficient emphasis on methods to increase transit use and ride-sharing. There are a number of inherent problems in increasing transit use to airports - currently around 15% for air passengers and 8% for airport employees. Air passengers require services that can conveniently accommodate baggage, are fairly direct, and are extremely reliable. Employees are a good market for transit because once "captured" by transit, the employee will tend to use the service on a regular basis. Transit use and ride-sharing for employees can be somewhat complicated by odd working hours, a characteristic of multiple-shift airport operations. However, ride-sharing can be promoted fairly effectively without great expense.

One of the key questions related to airport access is the potential effectiveness of various strategies to minimize airport traffic. In addition to helping relieve local traffic congestion and delay or reduce the need to construct expensive transportation facilities, these strategies would be beneficial from an energy and air quality perspective. Ground traffic mitigation measures are primarily targeted to air passengers and airport employees ("other" trips would be relatively unaffected by transit improvements or ride-sharing programs):

- 25% Transit Use - This strategy assumes that regional goals for transit ridership to airports are achieved and 25% of the air passengers and employees use some form of transit to the airports.

- Reduced "Kiss-and-Fly" - This strategy assumes additional long term parking is provided for resident passengers to reduce the number of pickup and dropoff trips. (Such a strategy may be counterproductive with respect to increasing transit use.)
- 25% Carpool/Vanpool Use - This strategy assumes that 25% of the airport employees participate in a ride-sharing program (20% in carpools and 5% in vanpools).

The estimated effectiveness of the individual strategies as well as the combined effectiveness of all of the mitigation strategies is shown below. The lower effectiveness of these strategies at San Francisco Airport can be attributed to the relatively high existing level of transit use and ride-sharing as well as the relatively large volume of "other" traffic.

EFFECTIVENESS OF TRAFFIC MITIGATION MEASURES

(Percentage Reduction In Total Airport Traffic)

<u>Strategy</u>	<u>Group(s) Affected</u>	<u>Airport</u>		
		<u>San Francisco</u>	<u>Oakland</u>	<u>San Jose</u>
● 25% Transit Use	All Passengers and Employees	6- 9%	14-17%	15-18%
● Reduced "Kiss-and-Fly"	Resident Passengers	2%	4- 5%	4- 5%
● 25% Carpool/Vanpool Use	All Employees	1- 2%	2- 3%	1- 2%
● Cumulative Reduction		9-13%	20-25%	20-25%

Evaluation of Airport Noise

Noise has become a critical issue at practically all major airports -- particularly at airports where future development and expansion plans are being debated. As a result of the concern over airport noise, the airlines are faced with expensive and complex noise control requirements. The airports, on the other hand, must contend with constant complaints and/or litigation involving their residential neighbors. Airports may also be obliged to initiate residential land acquisition programs, purchase noise easements or soundproof homes and schools, which may ultimately have enormous costs.

Airport noise control actions in effect at the various Bay Area airports include the following:

San Francisco Airport	<ul style="list-style-type: none"> - Noise monitoring - Operation of runways to direct flights over water - Modified flight procedures - Engine test restrictions
Oakland Airport	<ul style="list-style-type: none"> - Noise monitoring - Purchase of noise easement over parts of Bay Farm Island - Modified departure routes for late evening - Mandated use of South Runway by business jets
San Jose Airport	<ul style="list-style-type: none"> - Noise monitoring - \$50 million land acquisition program - Revised flight patterns and higher glide slope - Use of airline lease agreements to control noise - Establishment of midnight to 6 a.m. curfew

Airport noise is regulated by the State which has determined the maximum noise levels that will be permitted in residential communities surrounding the airports. The California Airport Noise Standards call for a phased reduction in airport noise over time such that the maximum level will not exceed 65 CNEL (Community Noise Equivalent Level) in residential areas in 1986.

In 1976 there were approximately 41,500 persons living in areas exposed to noise of 65 CNEL or greater. About 85% of these people were located in the noise impact area around San Francisco Airport. Although a large proportion of San Francisco flights take off and land over water, those that are not able to do so because of prevailing wind conditions affect a densely populated area that includes a large number of schools.

Regional noise forecasts show a worsening trend. While compliance with the Federal schedule for retrofitting, re-engining, or replacing aircraft that do not meet aircraft noise certification standards (FAR Part 36) is required by the mid-1980's, less than 30% of the aircraft in the U.S. fleet currently meet these standards. Further, changes in the airline fleet mix and aircraft technology will not be sufficient to compensate for the growth in passenger volumes and the development of new residences around existing airports. New residential areas include the Bay Farm Island development adjacent to Oakland Airport and "in fill" construction in existing residential neighborhoods around San Francisco and San Jose Airports. (At Oakland Airport, the number of persons living in new dwellings on Bay Farm Island and exposed to noise of 65 CNEL or greater is estimated to be between 2700 and 5200 persons depending on the year and airport system alternative.)

Projected airport noise exposure is summarized in the table below.

PROJECTED AIRPORT NOISE EXPOSURE

(Total Population and Dwelling Units
Included within 65 CNEL Noise Contour)

Year	Forecast	Population		Dwelling Units	
		Low	High	Low	High
1976	Existing	41,500		14,100	
1987	Low	45,640	46,640	16,480	16,510
	High	55,940	61,400	20,370	21,510
1997	Low	37,890	43,400	13,270	13,750
	High	45,180	56,620	15,920	19,430

These results illustrate the extremely difficult task of complying with the State Airport Noise Standards and suggest that as a practical matter more modest goals for noise abatement must be set that recognize some level of residual noise in residential areas.

Compared to the existing distribution of traffic among the Bay Area airports, the recommended regional plan would result in a 9% reduction in regional noise exposure in 1987 and a 20% reduction in 1997. The forecasted 1987 noise reduction under the regional plan would be larger if: 1) the closest housing on Bay Farm Island was not developed as planned (these units would, however, be subject to a noise easement thus achieving technical compliance with the State's noise standards), and 2) the flight track for eastbound flights from Oakland was altered to avoid flying over northern Alameda.

Alternatives that limit passenger traffic at San Jose Airport to 8 million annual passengers in 1997 show that approximately 1200 fewer persons would be affected in the San Jose area compared to the maximum proposed level of 10 million annual passengers (a 13% reduction). However, there is relatively little difference in total regional noise exposure, since these passengers would add to the noise impact at San Francisco and Oakland Airports.

Addition of a North Bay airport providing air service in the California Corridor results in a slight improvement in regional noise exposure, about a 3.5% reduction in total Bay Area population within the 65 CNEL contour. The impact on San Francisco Airport -- which many of these North Bay passengers would use -- is greater. It is estimated that the diversion of 1-2 million annual passengers would lower the population within the 65 CNEL contour 5.6 - 8.0 percent at San Francisco Airport. Noise contours were also prepared for the four potential North Bay airports. Based on existing land uses, only Sonoma County Airport would have any potential land use conflict.

The noise study also included an assessment of regional airport noise exposure assuming the following conditions: a) noisy aircraft are not replaced or re-engined according to the current Federal schedule, b) there was a total "curfew" on all Bay Area flights after 10 pm, and c) there was a "partial" curfew after 10 pm, essentially limiting operations to the newest technology aircraft. The results of these analyses are summarized below.

RESULTS OF AIRPORT NOISE SENSITIVITY ANALYSES

Analysis Year	Percentage Increase(+) or Decrease(-) in Population Exposed to 65 CNEL or Greater
● Partial Compliance with Federal Schedule for Retirement of Noisy Aircraft	1987
● Full "Curfew" Between 10 pm and 7 am	1997
● Limit Flights Between 10 pm - 7 am to Newest Technology Aircraft	1997

Evaluation of Aviation Air Quality Issues

Under the Federal Clean Air Act of 1970 and the Clean Air Act Amendments of 1977, each state is required to prepare detailed implementation plans demonstrating how the ambient air quality standards are to be met. Many California regions, including the Bay Area, have exceeded some or all the air quality standards. The Bay Area has been designated as an area where the Federal standards for carbon monoxide and ozone have not been achieved. The Environmental Management Plan developed for the Bay Area by ABAG, MTC, and the Bay Area Air Quality Management District (BAAQMD) presents an implementation plan for achieving these standards, but the plan does not include specific controls for aircraft or airports. (It does contain many vehicular controls that indirectly affect the airports.)

The air quality analysis addressed three key issues: a) the significance of aviation's contribution to regional oxidant problems, b) local and regional air quality effects resulting from alternative distributions of traffic among the Bay Area airports, and c) the effectiveness of various mitigation strategies in reducing local and regional air pollution. Regional level analyses dealt with hydrocarbons (HC) and nitrogen oxides (NOx) because of the role these chemicals play in ozone formation. Local air quality analyses dealt with carbon

monoxide (CO) concentrations at key "receptor" sites on and surrounding airport property.

Regional Air Quality Findings - For the analysis years 1987 and 1997, calculations show airport-related HC and NOx do not comprise a significant portion of the regional inventory--less than 3 percent for each pollutant under the worst case (the worst case assumes currently mandated reductions in vehicle emissions are implemented on schedule but no further reductions occur in emission characteristics of aircraft engines). Therefore, even if the emissions due to the airports were to be eliminated entirely, little or no effect would be detected in the regional ozone level. Also, no significant differences between airport system alternatives were discernible on a regional scale.

The analysis of two important mitigation measures (25% transit use and stricter aircraft engine controls), however, shows that airport-related HC could be reduced by 50% in 1987 and by 65% in 1997. For NOx, the reductions would be 10 to 30% for the same years. While these measures would not significantly affect regional emissions, long-range improvements in Bay Area air quality will most likely be made by incremental reductions in emissions from a number of sources.

Local Air Quality Findings - Under worst case conditions--peak airport activity levels, adverse wind and meteorological conditions, and no improvement in aircraft engine emissions -- only relatively minor problems were detected for the 1-hour CO standard. Under similar conditions for the 8-hour CO standard, more numerous exceedances were calculated at San Francisco and San Jose Airports. The San Francisco exceedances occur at the highest activity levels for each analysis year. Exceedances are located off the airport and are largely due to aircraft emissions. San Francisco exceedances are eliminated if aircraft emission standards become more stringent or if a greater amount of traffic is handled by other Bay Area airports. Exceedances at San Jose Airport occur under almost all cases, with the exception of the lowest activity levels in 1987. However, these exceedances occur opposite the South end of the main runway where few people will be located. Oakland Airport would not exceed air quality standards under any of the conditions evaluated.

The major question that arises from the local air quality analysis is whether to trade off improved air quality at San Francisco for poorer air quality at San Jose. At the former airport, there is a larger potential for adverse air quality conditions in residential communities. This occurs because there are two active runways aligned towards populated areas. At San Jose on the other hand, the area around Hamline and Spring Streets is being purchased for conversion to non-residential land uses. It is not expected that large concentrations of people will be located in this area. This suggests that from an air quality standpoint San Jose should serve a larger share of traffic as proposed in the regional plan.

Combining the four major mitigation strategies - stricter aircraft engine controls, 25% of the air passengers and employees using mass

transit, reduced "Kiss-and-Fly," and 25% ride-sharing by employees - showed that the beneficial impact of these measures would be significant for all analysis years and airport system alternatives.

Evaluation of Energy Use

Energy use and conservation has become a critical consideration in planning future transportation alternatives. The objective of the energy analysis was to assess the energy requirements of each airport system alternative. The principal energy uses considered were: a) the energy used by airlines in flying to and from the Bay Area, b) the energy used in ground access to airports, and c) the energy used in aircraft delays.

As the demand for air travel increases, the airlines will require more fuel. However, the introduction of more fuel-efficient aircraft will partially offset rising airline energy requirements. The largest source of energy consumption will be by aircraft flying to and from the Bay Area. Route system energy accounts for about 98% of the energy demand associated with each airport system alternative. Airlines flying to and from the Bay Area will use an estimated 1.6 to 1.9 billion gallons of fuel in 1987 and 1.8 to 2.3 billion gallons in 1997. Aircraft fuel consumption will be minimized by those alternatives that produce the fewest number of aircraft operations and the fewest aircraft-miles. The table below shows the estimated increase in route system energy.

AIRLINE ROUTE SYSTEM ENERGY REQUIREMENTS

(Estimated Increase Over 1977 Levels)

Year	Forecast	Percent Increase in Energy Use	
		Low	High
1987	Low	28%	34%
	High	45	53
1997	Low	40	47
	High	67	78

Aircraft delays generally occur due to excessive traffic or bad weather. Additional traffic at the Bay Area airports will cause aircraft delays to increase throughout the forecast period. Delays could result in up to 27.4 million gallons of fuel being wasted in 1997 but account for 0.5% or less of total energy use. Methods to reduce delay include shifting some traffic to less congested airports, reducing the concentration of flights at critical hours of the day, and improving the airfield and the air traffic control system.

The chief factor that contributes to ground access energy consumption is the length of the passenger's ground trip to the Bay Area airports. Airport system alternatives that increase the availability of flights at more convenient airports will reduce the average length of air passenger ground access trips. It is estimated that between 25 and 39 million gallons of fuel will be used annually by air passengers traveling to and from the Bay Area airports. If 25% of the air passengers and airport employees used transit to the airports, ground access energy demand would be reduced 8-11% for air passengers and 6-14% for airport employees.

Energy conservation is enhanced by the concentration of flights at major airports such as San Francisco. The expenditure of energy for additional flights at satellite airports greatly exceeds the energy savings resulting from reduced ground access distances or reduced aircraft delays. Because of this factor, the regional plan results in 5% greater energy use compared to the existing traffic distribution among Bay Area airports.

It should be noted that this conclusion is a product of the existing institutional setting in which airports compete for passengers through the frequency of flights they provide. Greater "management" of the airports as a regional system -- so that Oakland and San Jose provide more comprehensive schedules but, at the same time, airline capacity is closely tailored to regional demand -- would significantly reduce the energy penalty associated with more dispersed flights.

Addition of a North Bay airport also results in a slight energy penalty. However, due to the limited activity allocated to this airport, the difference in total airport system energy consumption with and without the North Bay airport is not significant (i.e., less than 0.1%).

Airport Financing and Capital Improvement Costs

Each of the Bay Area airports will need to provide capital improvements in the ensuing years to upgrade and expand their facilities. As San Francisco Airport's expansion and modernization program comes to an end, the emphasis will change to development programs at Oakland and San Jose Airports. Because of the greater uncertainty concerning traffic growth at these airports, improvements will need to be planned in stages and maximum flexibility will be required of new facilities. Continued high inflation rates will add to the expense of future airport improvement programs at all airports.

Each airport is in a different phase of development. San Francisco Airport is currently in the midst of a major expansion and modernization program. The total cost when completed is estimated to be over \$400 million, excluding financing costs. Because of delays and inflationary effects, the program has been reviewed and revised on several occasions. It is now estimated to cost between \$200-260 million to complete the remaining phases of construction involving renovation and remodelling of the terminal.

Oakland Airport has prepared an airport master plan for development up to the 6 million annual passenger level. A number of airport facilities would require expansion to handle this volume of passengers, including the aircraft parking areas, terminal ticketing and baggage areas, and passenger waiting areas. An initial program was begun in 1978 to enable the terminal to handle approximately 4 million annual passengers. The total cost to expand the airport to handle 6, 8, 10, and 13 million annual passengers is currently estimated to be \$55, \$79, \$105, and \$130 million, respectively.

The most recent master plan is that prepared by San Jose Airport. The master plan proposes expansion of the terminal, increased automobile parking, improved access from surrounding freeways, and lengthening of the two main runways. Improved cargo facilities would also be included. The estimated development cost to enable the airport to serve 1987 demand levels (5.3 million annual air passengers) would be \$74 million. Total capital improvement costs to serve 1997 demand levels (8.0 million annual air passengers) would be \$113 million.

As a result of airline deregulation, airport financing will become more challenging. Airlines are freer to come and go which could cause major fluctuations in airport revenues. At the larger airports throughout the nation such as San Francisco, airline deregulation initially produced tremendous pressures to build new, exclusive-use terminal facilities for new carriers and for incumbent carriers seeking to expand their route system. The risk in responding to such demands is large; the travel market can abruptly change while the financial obligations incurred to build new facilities remain over many years. San Francisco Airport will continue to experience pressures from new carriers wanting to serve the Bay Area through this airport.

Oakland and San Jose Airports will have different problems in financing their airport improvement programs. Substantial capital investments will be required in the future, and these investments will be large in relation to the market served. Traffic growth will be heavily influenced by airline commitments at San Francisco and the natural tendency of airlines to gravitate to the larger hub airports when economic conditions worsen. Therefore, the conditions under which major expansion programs can be launched must be carefully selected in order to assure financial success. The ability of these airports to enter into long-term agreements with the airlines will be a key cornerstone for future improvement programs.

Because of the different airport roles and development cycles, the financing capabilities of each airport are also different. Large airports such as San Francisco can generate sufficient internal revenues to finance a large percentage of their capital and operating needs. Oakland and San Jose airports, however, will rely to a much greater extent on Federal aid to construct necessary improvements. Federal money comes from an aviation Trust Fund derived from taxes on airline tickets, air freight, general aviation gasoline sales, and other miscellaneous sources. Recently a number of suggestions have been made that would substantially alter Federal financing of airports. New

legislation is needed to improve flexibility in airport financing and recognize changing development priorities in the region.

Airport Employment and Land Use Impacts

Individual airport employment projections show significant differences depending on the share of airline activity allocated to each airport. At the regional level, however, differences in total airport employment are not significant.

San Francisco will continue to provide the largest employment of all three airports due to its share of the regional passenger and air cargo market and the presence of United's maintenance operation.

Airline employment at San Jose and Oakland will grow at a faster rate than San Francisco as a result of new service at these airports.

The number of airline employees necessary to handle flights at Oakland and San Jose will not reach the same proportions as San Francisco Airport because of the preponderance of shorter distance flights, with correspondingly smaller staffing needs.

The number of government employees at the Bay Area airports will grow at a slow rate. Total government employment at San Francisco will actually decline due to the relocation of the U.S. Coast Guard to Sacramento.

Employment in air freight handling is expected to increase sharply and to continue to be concentrated at San Francisco Airport, despite some inconveniences due to lack of available land for expansion.

Growth in nearby hotel employment will not be as large as in the past due to increased competition from hotels in downtown San Francisco, Oakland, and San Jose.

There will be increased employment in off-airport parking and car rental agencies, particularly at San Francisco Airport.

Oakland and San Jose have sufficient land to meet almost any type of future airport expansion needs.

San Francisco, with its limited amount of vacant land, will be faced with difficulty in providing for certain types of airport-related employment needs. Space for current and future freight handling is of particular concern.

The potential growth of off-airport car rental and parking agencies will need to be addressed in the General Plan policies of affected cities.

Tabular Comparison of Alternatives

Table II-1 compares each of the airport system alternatives with respect to the factors discussed above.

Table II-1
1987 SUMMARY COMPARISON OF AIRPORT SYSTEM ALTERNATIVES

YEAR	FORE-CAST RANGE	ALT.	DESCRIPTION	AIRPORT ALLOCATIONS (M.A.P.)		ANNUAL AIRCRAFT OPERATIONS	ANNUAL AIR CARRIER DELAY	AIRPORT GROUND ACCESS			AIR QUALITY EMISSIONS			% REGION
				AIRCRAFT	AUTO			AVE. DIST.	PASS. VMT	EMP. VMT	AIRCRAFT	AUTO	TOTAL	
NOTES	-1-							-2-	-3-	-4-	-5-	-6-	-7-	-8-
1987	LOW	1	<u>Existing Airport Shares</u> Passenger distribution among airports same as base year. Service concentrated at SFO	SFO OAK SJC TOT	28.8 3.6 4.6 <u>37.0</u>	405,570	10,500	21.9	643	285	13.2	7.3	20.5	1.3
		3a	<u>Regional Airport Plan</u> OAK & SJC serve much larger share of local passengers	SFO OAK SJC TOT	24.0 7.0 6.0 <u>37.0</u>	423,340	7,020	18.6	562	301	13.9	6.6	20.5	1.3
	HIGH	1	<u>Existing Airport Shares</u> Passenger distribution among airports same as base year. Service concentrated at SFO	SFO OAK SJC TOT	33.5 4.2 5.3 <u>43.0</u>	460,610	18,920	21.9	748	307	15.1	8.7	23.8	1.6
		2	<u>Airline Plan - Airlines emphasize new service at OAK as SFO approaches 31 MAP policy limit</u>	SFO OAK SJC TOT	31.0 6.7 5.3 <u>43.0</u>	467,300	13,440	20.2	703	302	15.3	8.3	23.6	1.5
		3a	<u>Regional Airport Plan</u> OAK & SJC serve much larger share of local passengers	SFO OAK SJC TOT	27.6 8.4 7.0 <u>43.0</u>	482,830	10,400	18.5	650	301	15.6	8.0	23.6	1.5
		3b	<u>Regional Airport Plan/ North Bay - Same as 3a except limited intra-state service added in North Bay</u>	SFO OAK SJC NB TOT	27.0 8.0 7.0 1.0 <u>43.0</u>	484,630	9,700	17.6	620	298	15.6	7.7	23.3	1.5
		4a	<u>SJC Constrained - Service at SJC constrained below local demand levels for environmental reasons, but otherwise similar to 3b</u>	SFO OAK SJC NB TOT	28.7 8.0 5.3 1.0 <u>43.0</u>	465,860	11,650	17.9	630	300	15.5	7.7	23.2	1.5

Table II-1
1987 SUMMARY COMPARISON OF AIRPORT SYSTEM ALTERNATIVES (CONT.)

ALT.	ENERGY USE			NOISE			AIRPORT EMPLOYMENT			NOTES	
	ROUTE SYSTEM	DELAY	GROUND ACCESS	POP.	DWELL. UNIT	SCHOOLS/ HOSPITALS	ON AIRPORT	OFF AIRPORT	TOTAL		
	-9-	-10-	-11-	-12-	-13-	-14-	-15-	-16-			
1	1630.7	5.9	28.4	1665.0	46,640	16,510	23	36,980	7,030	44,010	1/ SFO-San Francisco Airport M.A.P. - Millions OAK-Oakland Airport of Annual Pas- SJC-San Jose Airport sengers NB-North Bay Airport
3a	1708.2	3.8	24.9	1736.9	45,640	16,480	18	35,420	7,700	43,120	2/ Annual hours of aircraft delay. *1997 IFR Demand/Capacity ratio. **1997 VFR2 Demand/ Capacity ratio.
1	1845.5	10.8	33.0	1889.3	61,400	21,510	24	39,820	7,840	47,660	3/ Average ground travel distance for all air passengers-miles.
2	1930.2	7.5	31.1	1968.8	57,720	20,140	25	39,120	8,220	47,340	4/ Annual Vehicle Miles of Travel for Air Pas- sengers-millions.
3a	1946.7	5.7	28.8	1981.2	57,860	20,960	22	37,600	8,490	46,090	5/ Annual Vehicle Miles of Travel for Airport Em- ployees-millions.
3b	1949.5	5.3	27.5	1982.3	55,940	20,370	22	38,400	8,510	46,990	6/ Tons per day of Hydrocarbons (HC) and Nitrogen Oxides (NO _x).
4a	1938.7	6.1	28.3	1973.1	56,800	20,440	26	39,350	8,400	47,750	7/ Tons per day of Hydrocarbons (HC) and Nitrogen Oxides (NO _x). Includes air passengers and employees.
										8/ Percent of regional emissions inventory at- tributed to aviation. Based on Air Quality Management Plan projections.	
										9/ Millions of equivalent gallons of fuel used by aircraft in flight annually.	
										10/ Millions of equivalent gallons of fuel used in delays to aircraft annually.	
										11/ Millions of equivalent gallons of fuel used in ground access to airports annually.	
										12/ Estimated population within 65 CNEL Contour.	
										13/ Estimated number of dwelling units within 65 CNEL Contour.	
										14/ Estimated number of schools and hospitals within 65 CNEL Contour.	
										15/ From ABAG <u>Airport Employment Projections and</u> <u>Impacts</u> .	
										16/ From ABAG <u>Airport Employment Projections and</u> <u>Impacts</u> .	

Table II-1

1997 SUMMARY COMPARISON OF AIRPORT SYSTEM ALTERNATIVES

YEAR	FORE-CAST RANGE	ALT.	DESCRIPTION	AIRPORT ALLOCATIONS (M.A.P.)		ANNUAL AIRCRAFT OPERATIONS	ANNUAL AIR CARRIER DELAY	AIRPORT GROUND ACCESS			AIR QUALITY EMISSIONS			
				-1-	-2-			AVE. DIST.	PASS. VMT	EMP. VMT	AIRCRAFT	AUTO	TOTAL	% REGION
NOTES														
1997	LOW	1	<u>Existing Airport Shares</u> Passenger distribution among airports same as base year. Service concentrated at SFO	SFO OAK SJC TOT	35.0 4.4 5.6 45.0	428,560	19,930	23.2	851	305	7.6	8.8	16.4	.9
		2	<u>Airline Plan - Airlines</u> emphasize new service at OAK as SFO approaches 31 MAP	SFO OAK SJC TOT	31.0 8.4 5.6 45.0	430,660	11,750	21.1	799	300	7.7	8.5	16.2	.9
		3a	<u>Regional Airport Plan</u> OAK and SJC serve much larger share of local passengers	SFO OAK SJC TOT	27.0 10.0 8.0 45.0	437,760	9,350	19.5	750	292	7.7	8.1	15.8	.9
	HIGH	1	<u>Existing Airport Shares</u> Passenger distribution among airports same as base year. Service concentrated at SFO	SFO OAK SJC TOT	43.6 5.5 6.9 56.0	511,910	49,890 2.3* 1.2**	23.2	1059	339	9.1	11.1	20.2	1.1
		3a	<u>Regional Airport Plan</u> OAK and SJC serve much larger share of local passengers	SFO OAK SJC TOT	32.2 13.8 10.0 56.0	47,000	15,800	19.3	921	325	9.4	10.1	19.5	1.1
		3b	<u>Regional Airport Plan/</u> North Bay - Same as 3a except limited intra-state service added in North Bay	SFO OAK SJC NB TOT	31.0 13.0 10.0 2.0 56.0	532,480	13,900 1.6* 0.8**	18.5	892	324	9.4	9.8	19.2	1.1
		4a	<u>SJC Constrained - Overflow to SFO - SJC limited to 8.0 MAP.</u> Overflow to SFO.	SFO OAK SJC NB TOT	33.0 13.0 8.0 2.0 56.0	505,630	15,500	19.6	941	327	9.4	10.2	19.6	1.1
		4b	<u>SJC Constrained - Overflow to OAK - SJC limited to 8.0 MAP.</u> Overflow to OAK.	SFO OAK SJC NB	31.0 15.0 8.0 2.0 56.0	530,040	14,700	19.6	951	325	9.4	10.2	19.6	1.1

Table II-1
1997 SUMMARY COMPARISON OF AIRPORT SYSTEM ALTERNATIVES (CONT.)

ALT.	ENERGY USE				NOISE			AIRPORT EMPLOYMENT			NOTES
	ROUTE SYSTEM -9-	DELAY -10-	GROUND ACCESS -11-	TOTAL	POP. -12-	DWELL. UNIT -13-	SCHOOLS/ HOSPITALS -14-	ON AIRPORT -15-	OFF AIRPORT -16-	TOTAL	
1	1789.9	10.8	33.5	1834.2	43,400	14,980	14	40,190	8,630	48,820	1/ SFO-San Francisco Airport OAK-Oakland Airport SJC-San Jose Airport NB-North Bay Airport
2	1863.0	6.3	29.6	1898.9	39,700	13,750	11	38,860	9,310	48,170	2/ Annual hours of aircraft delay. *1997 IFR Demand/Capacity ratio. **1997 VFR2 Demand/Capacity ratio.
3a	1869.2	4.9	27.8	1901.9	37,890	13,270	14	37,770	9,720	47,490	3/ Average ground travel distance for all air passengers-miles. 4/ Annual Vehicle Miles of Travel for Air Passengers-millions.
1	2129.0	27.4	39.2	2195.6	56,620	19,430	24	44,850	11,290	56,140	5/ Annual Vehicle Miles of Travel for Airport Employees-millions.
3a	2264.0	8.3	34.1	2306.4	46,820	16,410	16	41,670	12,440	54,110	6/ Tons per day of Hydrocarbons (HC) and Nitrogen Oxides (NO _x). 7/ Tons per day of Hydrocarbons (HC) and Nitrogen Oxides (NO _x). Includes air passengers and employees.
3b	2268.7	7.3	33.1	2309.1	45,180	15,920	16	41,770	12,440	54,210	8/ Percent of regional emissions inventory attributed to aviation. Based on Air Quality Management Plan data.
4a	2262.2	8.3	34.8	2305.3	46,340	16,140	17	42,240	12,150	54,390	9/ Millions of equivalent gallons of fuel used by aircraft in flight annually. 10/ Millions of equivalent gallons of fuel used in delays to aircraft annually.
4b	2278.9	7.6	35.2	2321.7	45,040	15,940	17	41,630	12,090	53,720	11/ Millions of equivalent gallons of fuel used in ground access to airports annually. 12/ Estimated population within 65 CNEL Contour. 13/ Estimated number of dwelling units within 65 CNEL Contour. 14/ Estimated number of schools and hospitals within CNEL Contour. 15/ From ABAG <u>Airport Employment Projections and Impacts</u> . 16/ From ABAG <u>Airport Employment Projections and Impacts</u> .

Table II-1
1997 SUMMARY COMPARISON OF AIRPORT SYSTEM ALTERNATIVES

YEAR	FORE-CAST RANGE	ALT.	DESCRIPTION	AIRPORT ALLOCATIONS (M.A.P.)		ANNUAL AIRCRAFT OPERATIONS	ANNUAL AIR CARRIER DELAY	AIRPORT GROUND ACCESS			AIR QUALITY EMISSIONS				
				AIRPORT	ALLOCATION			AVE. DIST.	PASS. VMT	EMP. VMT	AIRCRAFT	AUTO	TOTAL	%	REGION
NOTES	-1-												-6-	-7-	-8-
1997	HIGH	4c	<u>Limit SJC - Expand North Bay</u> - SJC limited to 8.0 MAP. SFO and OAK limited to 31.0 and 13.0 MAP. Domestic service expanded in North Bay	SFO	34.0	530,120	18,600	20.3	981	324	9.4	10.4	19.8	1.1	
				OAK	10.0										
				SJC	8.0										
				NB	4.0										
				TOT	56.0										
		4d	<u>Limit SJC - Overflow to Existing Airports</u> . SJC limited to 8.0 MAP. No service in North Bay	SFO	33.0	524,610	17,100	20.6	995	325	9.4	10.6	20.0	1.1	
				OAK	15.0										
				SJC	8.0										
				NB											
				TOT	56.0										

Table II-1
1997 SUMMARY COMPARISON OF AIRPORT SYSTEM ALTERNATIVES (CONT.)

ALT.	ENERGY USE			NOISE			AIRPORT EMPLOYMENT			NOTES	
	ROUTE SYSTEM	DELAY	GROUND ACCESS	TOTAL	POP.	DWELL. UNIT	SCHOOLS/ HOSPITALS	ON AIRPORT	OFF AIRPORT		
	-9-	-10-	-11-	-	-12-	-13-	-14-	-15-	-16-	-	
4c	2290.0	10.5	36.3	2336.8	47,890	16,580	17	41,160	11,850	53,010	
4d	2249.4	9.1	36.8	2295.3	47,480	16,620	18	41,490	11,980	53,470	

- 1/ SFO-San Francisco Airport M.A.P. - Millions of Annual Passengers
- OAK-Oakland Airport
- SJC-San Jose Airport
- NB-North Bay Airport
- 2/ Annual hours of aircraft delay. *1997 IFR Demand/Capacity ratio. **1997 VFR2 Demand/Capacity ratio.
- 3/ Average ground travel distance for all air passengers-miles.
- 4/ Annual Vehicle Miles of Travel for Air Passengers-millions.
- 5/ Annual Vehicle Miles of Travel for Airport Employees-millions.
- 6/ Tons per day of Hydrocarbons (HC) and Nitrogen Oxides (NOx).
- 7/ Tons per day of Hydrocarbons (HC) and Nitrogen Oxides (NOx). Includes air passengers and employees.
- 8/ Percent of regional emissions inventory attributed to aviation. Based on Air Quality Management Plan data.
- 9/ Millions of equivalent gallons of fuel used by aircraft in flight annually.
- 10/ Millions of equivalent gallons of fuel used in delays to aircraft annually.
- 11/ Millions of equivalent gallons of fuel used in ground access to airports annually.
- 12/ Estimated population within 65 CNEL Corridor.
- 13/ Estimated number of dwelling units within 65 CNEL Corridor.
- 14/ Estimated number of schools and hospitals within 65 CNEL Corridor.
- 15/ From ABAG Airport Employment Projections and Impacts.
- 16/ From ABAG Airport Employment Projections and Impacts.

III. POLICIES AND RECOMMENDATIONS

This section presents the goal, objectives, policies, and recommendations developed during the course of the Regional Airport Plan Update Program. The goal is a single statement describing what the plan seeks to accomplish. The objectives define the scope of work for the update study. Policies provide the key to implementing the plan by describing general guidelines for future decisions. Finally, the recommendations translate findings from the study into specific suggestions within the framework of the preceding policies.

Goal

To plan and coordinate the development of a safe, convenient, and environmentally acceptable system of airports in the Bay Area that satisfies a range of regional and community needs.

Objectives

- 1.1 Develop support and concurrence for the Regional Airport Plan at all levels of government.
- 1.2 Develop explicit policies to guide the implementation of the regional plan. These policies should be arranged in a series of stages whereby a more direct, active regional role is called for if progress towards plan implementation is not made through more cooperative means.
- 1.3 Reassess future passenger and air cargo demand based on new information concerning airline deregulation, fares, energy availability, economic conditions, etc.
- 1.4 Develop methods to better match aviation demand with the supply of ground access, airport and airspace capacity.
- 1.5 Develop methods to expand the role of private and public transit and high occupancy vehicles in providing new ground access capacity to airports.
- 1.6 Develop a strategy for controlling and abating aircraft noise in the region.
- 1.7 Review the impact of airport activity on regional and local air quality conditions and recommend appropriate mitigation measures.
- 1.8 Review the impact of regional recommendations on energy consumption and conservation concerns and recommend appropriate mitigation measures.
- 1.9 Review the need for filling of the Bay to a) provide additional airport system capacity, or b) provide noise abatement. (The

position of the Bay Conservation and Development Commission is that aircraft noise should not alone constitute a reason to fill the Bay)

- 2.0 Develop methods to coordinate future capital investments with regional development priorities.

Policies

● General

- 1.1 The Regional Airport Plan as it is adopted and amended will serve as the Airport Element of ABAG's Regional Plan and MTC's Regional Transportation Plan.
- 1.2 The planning and development of the regional airport system shall be an integral part of the regional transportation system and shall be coordinated with Federal, State, regional and local levels of government. To the extent possible, the planning process shall identify and help resolve conflicts between various jurisdictions, plans, and policies.
- 1.3 The regional airport system shall be planned to provide a convenient and safe system for its users and to minimize airspace conflict and delay.
- 1.4 The regional airport system shall be developed and operated in a manner that shall minimize noise and air pollution in sensitive and populated areas. Development of the system shall also be planned to minimize disruption of wildlife habitats, tidelands and the Bay.

● Plan Implementation

- 1.1 Development of additional airport system capacity at the Bay Area airports shall be consistent with the recommendations in the Regional Airport Plan.
- 1.2 Cooperation from the airline industry shall be requested in implementing service development proposals in the regional plan.
- 1.3 The Regional Airport Planning Committee shall also explore operational, institutional and economic methods for achieving airline service development objectives.
- 1.4 In proposing new strategies for traffic distribution, concurrence from local Bay Area communities shall be requested.
- 1.5 The ultimate role of a North Bay airport shall be determined through a cooperative study involving ABAG, MTC, BCDC, and the North Bay communities.

- **Airport Noise**

- 1.1 Current limitations on cumulative airport noise in residential areas contained in the California Airport Noise Standards should be retained.
- 1.2 Compliance of airports with the State's Airport Noise Standards shall be the goal for all airports in the region; however, in recognition of the difficult task of reaching this goal, reasonable and continuing progress shall be used as a criterion for regional decision making.
- 1.3 The regional noise allocations for each airport as adopted and revised by the Regional Airport Planning Committee shall be used as a guide for assessing reasonable and continuing progress. The capability of the airlines to provide expanded service in the Bay Area will be constrained by the industry's ability to perform within these guidelines.
- 1.4 At airports surrounded by substantial existing development, every effort shall be made to control airport noise through on-airport actions.
- 1.5 Airport noise abatement plans should specifically consider the need to mitigate loud single events, particularly those occurring in the late evening.
- 1.6 In order to resolve residual noise impacts -- those existing or projected impacts remaining after application of all reasonable on-airport measures -- a cooperative and continuing program shall be established between the airports and local communities to achieve land use compatibility.
- 1.7 "In-fill" of vacant land shall be permitted in existing or projected noise impact areas only when a) noise insulation is incorporated in new construction and is designed to reduce the maximum anticipated outside noise level for the project area (either existing or future, whichever is greater) to acceptable interior levels, and b) noise easements are concurrently provided to the airport.
- 1.8 Noise insulation and noise easements should not be used as a means to achieve compliance with the State's noise standards for large new developments in proximity to existing or proposed airports.
- 1.9 Legislation that would substantially delay the Federal compliance schedule for retirement of aircraft that do not meet FAR Part 36 noise certification standards should be opposed.

- 2.0 Air traffic routings and procedures shall place a high priority on reducing aircraft noise including "overflight" noise at higher altitudes. Changes in flight procedures that result in a shift in noise levels from one part of the Bay Area to another should be coordinated with regional agencies and local jurisdictions.
- 2.1 Land around Hamilton AFB, Sonoma County Airport, Napa County Airport, and Travis AFB shall be maintained in compatible use until such time as the policy concerning the potential for limited intrastate service is clarified in the regional plan.
- 2.2 The land use interpretations of the State Office of Noise Control are adopted as the basis for determining airport/community noise compatibility relationships.

• **Airspace**

- 1.1 Slot allocations and/or user fees are endorsed as a means to rationalize airport and airspace use when air traffic delays approach or regularly exceed acceptable levels.
- 1.2 Priorities for use of airports and airspace by air carriers, general aviation and the military shall be established based on air safety, the need for access to a specific airport, and the potential for using alternate facilities.
- 1.3 Separate Instrument Landing System (ILS) facilities shall be developed for exclusive use by general aviation. Separate general aviation facilities shall be developed at the major airports where practicable.
- 1.4 The establishment of Terminal Control Areas (TCA's) and Terminal Radar Service Areas (TRSA's) shall be the minimum necessary to assure safety and shall provide for adequate visual flight into and out of the Bay Area.

• **Ground Access to Airports**

- 1.1 Ground transportation facilities and services shall be planned and programmed to reinforce the role of each airport in the regional plan.
- 1.2 Provisions for new ground access capacity to Bay Area airports shall place maximum reliance on the use of public and private transit services and high occupancy vehicles.
- 1.3 Transportation shall be provided between airport terminals to maximize convenience for the passenger and facilitate the redistribution of airline flights.
- 1.4 The long range goal of transportation development programs at all airports shall be to serve a minimum of 25% of the air

passenger and airport employee trips by transit.* Staged transit ridership goals shall be established at each airport in accordance with the requirements for preparation of transportation development programs.

- 1.5 Provision of on-airport transportation facilities (e.g., access roads and parking space) shall be consistent with airport transit ridership goals.
- 1.6 Airports shall study means to provide preferential treatment for transit adjacent to and on airport property.
- 1.7 Transportation programs for airport employees shall include the development of ride-sharing programs.
- 1.8 Airport development plans shall consider ground access requirements and appropriate ground access projects shall be included in the Regional Transportation Improvement Program prior to expansion of the airport.

● Energy Conservation

- 1.1 The airline industry shall attempt to maintain a minimum annualized load factor of 60%.
- 1.2 In any future allocation of energy supplies, essential air transportation services from the Bay Area shall be protected and preserved.
- 1.3 A reduction in intra-Bay airline operations is encouraged for energy conservation purposes.
- 1.4 Energy conservation shall be considered in the routing of aircraft into and out of the Bay Area.

● Air Quality

- 1.1 Combined airport and background emissions shall not exceed Federal or State standards in any areas off the airport where people normally live or work. Required reductions in airport emissions shall be in proportion to the airport's contribution to total emissions at the location of the exceedance.
- 1.2 A continuing program for reducing aircraft engine emissions as recommended by the EPA should be implemented.

● Project Review

- 1.1 Airport development plans shall be coordinated with Federal, State and local agencies.

*Transit is defined to include all vehicles carrying 14 or more passengers.

- 1.2 The preparation of appropriate airport noise abatement programs, ground transportation development programs, and air quality improvement programs is required for favorable action on regionally significant projects submitted for regional review.* Regionally significant projects are those that expand airport capacity or have major adverse impacts on the environment.
- 1.3 Specific mitigation measures shall be included as part of an airport expansion project in the event there is unavoidable environmental disruption.

- **Policy for Airline Service at a New Location**

- 1.1 Development of new airline service and facilities at airports not currently receiving service shall be planned and coordinated with local jurisdictions.
- 1.2 No new airline facility shall be developed with public funds unless a plan exists to assure the continued use of the facility and recovery of public investment.
- 1.3 Provision of adequate ground access facilities shall be a prerequisite for development of airline service at a new location. Transit ridership goals shall be established.
- 1.4 Airport sites that enhance airspace efficiency shall receive a high priority.
- 1.5 Initiation of airline service at a new location shall require that the airport be able to meet the January 1, 1986 State Airport Noise Standards.
- 1.6 Acquisition of land for potential new airport sites shall include sufficient land to meet the 65 CNEL criterion level for traffic allocated to the airport in the regional plan.
- 1.7 Evaluation of new airport sites shall include an air quality assessment.

- **Financing of Capital Improvements and Other Programs**

- 1.1 Continuation of the aviation Trust Fund is supported. Monies accumulated in the Trust Fund should be available to all Bay Area air carrier airports.
- 1.2 A five year Transportation Improvement Program should be developed for air carrier airports in the region and coordinated with the regional agencies. The apportionment of money to a Bay Area "hub" fund rather than individual airports is endorsed.

*Office of Management and Budget Circular A-95 or California Government Code Section 66520.

- 1.3 Use of a passenger facility charge should be considered as a means to provide matching money for federal aid, and to finance airport ground access projects and residential noise insulation programs.

Plan Recommendations

- **Regional Forecasts** - Airport facilities in the Bay Area will be required to handle 37 to 43 million annual passengers by 1987 and 45 to 56 million annual passengers by 1997. Air cargo volumes will grow to 790 to 838 thousand tons in 1987 and 1,284 to 1,784 thousand tons in 1997. The uncertainty as to exactly when these levels will be reached is reflected in the adoption of a variable time window of +2 years in 1987 and +3 years in 1997. For example, the actual passenger "forecast" is:

<u>Forecast</u>	<u>Time Variation</u>	<u>Demand Variation</u>
"1987" Forecast	1985-1989	37,000,000-43,000,000 annual passengers
"1997" Forecast	1994-2000	45,000,000-56,000,000 annual passengers

- **Annual Traffic Allocations** - The allocation of traffic shown in Table III-1 shall be used to guide development of airline service and facilities in the Bay Area.

- **Statement of Airport Roles**

San Francisco International Airport:

San Francisco Airport will continue in its role as the major supplier of airline service for the region. Most air cargo and international flights will remain at San Francisco Airport, as will the region's connecting passenger traffic. The rate of passenger growth will, however, gradually decrease as new airline service is provided at other Bay Area airports. The policy limit of 31 million annual passengers is retained because of the need to control and abate airport noise, because of deficiencies in airport landside capacity and because of the need to better utilize airport and airspace capacity in the Bay Area. Prior to reaching this limit, agreements shall be developed among Bay Area airport operators and local communities with respect to the distribution of future airline service in the Bay Area. Cooperation will also be required from the airline industry.

Metropolitan Oakland International Airport:

Air service at Oakland will be expanded and improved in order to accommodate a larger share of future Bay Area traffic. Most new airline service will be domestic; however, some international service will also be developed. In addition to serving the East

Table III-1
RECOMMENDED REGIONAL TRAFFIC ALLOCATIONS

1977 Conditions

Airport	Passengers* Millions	% Region	Aircraft Movements Thousands	% Region	PPO**	Air Cargo Tons Thousands	% Region
San Francisco	18.9	77.3%	256.3	71.6%	81.2	470.0	95.9%
Oakland	2.5	10.2	43.7	12.2	57.7	7.9	1.6
San Jose	3.1	12.5	53.0	16.2	53.7	11.2	2.3
Total	24.5	100.0%	358.0	100.0%	73.5	490.1	100.0%

1987 - Low Forecast

Airport	Passengers* Millions	% Region	Aircraft Movements Thousands	% Region	PPO**	Air Cargo Tons Thousands	% Region
San Francisco	24.0	64.9%	248.3	58.7%	104.1	717	90.8%
Oakland	7.0	18.9	89.4	21.1	80.3	40	5.0
San Jose	6.0	16.2	91.0	20.1	71.0	33	4.2
Total	37.0	100.0%	423.3	100.0%	92.0	790	100.0%

1987 - High Forecast

Airport	Passengers* Millions	% Region	Aircraft Movements Thousands	% Region	PPO**	Air Cargo Tons Thousands	% Region
San Francisco	27.0	62.8%	271.2	56.0%	107.2	756	90.2%
Oakland	8.0	18.6	104.0	21.4	80.3	43	5.1
San Jose	7.0	16.3	97.8	20.2	72.6	36	4.3
North Bay	1.0	2.3	11.2	2.4	5.6	3	.4
Total	43.0	100.0%	484.7	100.0%	93.6	838	100.0%

1997 - Low Forecast

Airport	Passengers* Millions	% Region	Aircraft Movements Thousands	% Region	PPO**	Air Cargo Tons Thousands	% Region
San Francisco	27.0	60.0%	257.4	58.8%	113.3	1,137	88.5%
Oakland	10.0	22.2	98.6	22.5	106.1	87	6.8
San Jose	8.0	17.8	81.8	18.7	99.6	60	4.7
Total	45.0	100.0%	437.8	100.0%	109.0	1,284	100.0%

Table III-1 (cont'd)
1997 - High Forecast

Airport	Passengers* Millions	% Region	Aircraft Movements Thousands	% Region	PPO**	Air Cargo Tons Thousands	% Region
San Francisco	31.0	55.4%	281.9	52.9%	118.9	1,524	85.4%
Oakland	13.0	23.2	126.5	23.8	107.4	150	8.4
San Jose	10.0	17.8	102.2	19.2	99.6	105	5.9
North Bay	2.0	3.6	21.9	4.1	91.3	5	.4
Total	58.0	100.0%	532.5	100.0%	111.1	1,784	100.0%

*On and off passengers. Includes "connecting" passengers but excludes "through" passengers.

**Passenger per Operation (excludes Charter, non revenue, and air cargo flights; also excludes "through" passengers).

Bay, Oakland Airport will also relieve San Francisco Airport by providing convenient ground transportation for passengers with destinations in downtown San Francisco. New airline service, as well as improved ground transportation, will enhance the attractiveness of Oakland for resident and visiting air travelers and for the airline industry. Other direct benefits from using Oakland will be reduced airspace delays and limited noise restrictions due to the availability of overwater approaches and departures. Air cargo will also increase as a result of expanded domestic service. Oakland's traffic can be accommodated on a single runway. Oakland's North Airport could also serve as a major feeder airport for third level airlines thus relieving air carrier facilities in the region.

San Jose Municipal Airport:

Continuing development in the South Bay will place pressures on San Jose Airport to provide expanded airline facilities. Local demand that cannot be served at San Jose Airport will add to airport noise and traffic problems at other airports in the Bay Area. New service will be selectively increased to major domestic markets; however, the supply of new service will be controlled by airport noise abatement policies. Traffic growth may have to be constrained in the short-range due to the limited availability of new noise technology aircraft; however, the potential for handling up to 10 million annual passengers exists in the long-range with advanced aircraft versions in service. Development of local transit services needs to be stressed because of congestion on surrounding freeways and the limited amount of airport land for new parking and circulation.

North Bay Airport:

Regional traffic allocations to the North Bay contemplate the introduction of limited intrastate service at one or more existing airports--Hamilton AFB, Sonoma County, Napa County, or Travis AFB (Joint Use).* In addition to the convenience for the local air traveler, the placement of new airline service in the North Bay would provide an incremental measure of noise relief for communities around other Bay Area airports and also provide some reduction in airspace delays. The volume of passengers attracted depends on the specific airport location. The decision to recommend such service is primarily a local determination based on the air service benefits and community impacts. However, the long-range regional impacts on other airports in the Bay Area and on communities in the North Bay are sufficient to warrant a cooperative study of aviation requirements in this area. Such a study would involve ABAG, MTC, BCDC, and local North Bay jurisdictions.

*As noted in the earlier Regional Airport System Study, Travis AFB could play a larger role in the regional system by accommodating overflow from the other Bay Area airports.

● **Plan and Project Review** - One of the key actions taken during the update program was the adoption of criteria to be used in evaluating future airport improvement projects that are classified "regionally significant." Projects would normally be classified regionally significant as a result of their anticipated effects on airport system capacity or the environment. By resolution* ABAG and MTC indicated that they would not "favorably review and recommend approval of future grant application unless, among other things, there is evidence that the Airport has an effective noise abatement program, an effective ground transportation development program, and an effective air quality improvement program as necessary, all of which are in accord with RTP (Regional Transportation Plan) objectives, and only where the Airport has taken, and is taking, action to achieve demonstrable progress in the following specific areas which are of concern..."

- 1) Evidence from the Airport's noise monitoring system that the trend in Airport noise is such that future Airport noise levels will not exceed the noise levels calculated under the Regional Airport Plan Update Program for the traffic allocation shown in the Regional Transportation Plan.
- 2) Evidence that the Airport has, in cooperation with local jurisdictions, developed a plan for reducing the amount of incompatible land within the 65 CNEL contours calculated above.
- 3) Evidence that the Airport has achieved the 25 percent transit capacity goal contained in the Regional Transportation Plan; or evidence that the Airport is taking all appropriate actions to assure that transit capacity and ridership is increasing as shown by periodic reports from the transit operators serving the Airport, and evidence that a target date has been established by which the Airport expects to realize the 25 percent goal contained in the Regional Transportation Plan.
- 4) Evidence that the Airport has embarked on an effective program to develop the use of mass transit service and to provide incentives for Airport passengers and employees to use mass or pooled transportation, including such measures as:
 - a. Installation of transit information facilities and programs in terminals which are readily available to passengers;

*See for example, MTC Resolution 592, "Policies for Review of Future Requests for Federal or State Aid by Bay Area Airports."

- b. Programs which will provide convenient facilities which make mass transit services attractive to passengers and Airport employees;
 - c. Programs to encourage car pooling or van pooling among Airport employees;
 - d. Programs through which the Airport takes a leadership role in recommending improvements to existing transit services and scheduling.
- 5) Evidence that air pollution generated at the Airport is within applicable Federal and State standards or that specific measures are being taken to reduce pollution levels as rapidly as possible; . . . "

The purpose of these recommendations is to provide criteria to the Airports so that they will be fully apprised in advance of the basis for future actions on grant applications submitted for regional review under Office of Management and Budget Circular A-95 and California Government Code Section 66520.

- **Airport Noise Allocations** - One of the key recommendations resulting from the plan update program concerns the regional airport noise allocation system. This recommendation establishes a noise "budget" for each airport based on the airport's share of traffic in the Regional Airport Plan. In developing the noise budget, it has been assumed that all aircraft using the Bay Area airports will meet Federal Aviation Regulations - Part 36 aircraft noise certification requirements by 1987.

Such a budget provides a regional framework for airport noise abatement while allowing airport operators considerable latitude in developing appropriate local control strategies for achieving these goals. More stringent goals established as a result of airport/community land use compatibility studies are consistent with the spirit and intent of the regional noise allocation recommendation. In particular, the San Francisco/San Mateo Joint Land Use Study has developed an Action Plan that could lower the number of dwelling units within the 1986 65 CNEL contour to 7500 units.

The major elements of a workable system include the following:

- 1) A commitment by Bay Area airports to participate in the regional noise allocation system;
- 2) An agreement with each operator as to how much "credit" will be given towards the noise budget for sound treatment of residences surrounding the airport;

*Airport noise in residential areas must not exceed 70 CNEL by January 1, 1981 and 65 CNEL by January 1, 1996.

- 3) A method for developing noise contours on regular basis, such that noise monitoring data is used to generate accurate contours which are then transferred to a land use map to determine the number of dwelling units impacted.

The relationship of airport noise levels to the airport's noise allocation shall be reviewed by ABAG and MTC in evaluating future requests for Federal airport development funds and for commenting on future requests for variances from the State Noise Standards.

The noise budget is defined in terms of the number of dwelling units within the projected 65 CNEL noise contour at each airport. Interim budgets for critical compliance dates under the California Airport Noise Standards are established on a straight line basis from 1976 noise levels. (It should be pointed out that the initial focus of such a system is on controlling airport noise levels without considering the extent to which this noise has been mitigated by sound treatment of residences and/or purchase of noise easements off the airport. From a conceptual viewpoint, correction of incompatible land uses off the airport is considered a separate and independent action required to achieve further compliance with the State Noise Standards.)

A further specific recommendation has to do with potential new runways at San Francisco Airport for noise abatement. In this regard, construction of new runways in the Bay at San Francisco Airport for noise abatement purposes shall not be considered a high priority while other Bay Area airports are underutilized or serve only a portion of the traffic allocated to them in the regional plan.

REGIONAL AIRPORT NOISE ALLOCATION
 (Projected Dwelling Units Within 65 CNEL Contour)

<u>Airport</u>	<u>1976</u>	<u>1981*</u>	<u>1986*</u>	<u>1987</u>	<u>1997</u>
San Francisco	12,000	10,690	8,970	8,630	8,630
Oakland	80	1,730	3,390	3,720**	3,320
San Jose	<u>1,630***</u>	<u>3,800</u>	<u>5,970</u>	<u>6,400</u>	<u>2,990</u>
Regional Total	14,110	16,220	18,370	18,750	15,920

*Interpolated on straight line basis for years when State Airport Noise Standards change to more stringent criterion.

**Assumes departure routes are modified to eliminate noise impacts in north Alameda.

***Based on 1975 noise contour.

- **Airport Financing** - The formula for apportioning money from the Federal aviation Trust Fund should be revised. Under existing legislation, funds are apportioned directly to individual airports based on the number of "enplaned" passengers. This formula does not recognize future airport development needs or changing development priorities within a system of airports. It is therefore recommended that a revised method of apportioning funds be developed for areas where there is an adopted regional airport system plan. A single enplanement fund should be created for the region based on enplanements of all airports comprising the regional system. A five year Transportation Improvement Program should be prepared cooperatively by the airport operators and regional agencies and submitted annually to the Federal Aviation Administration. Federal funds should be apportioned to the Bay Area airports based on the program submitted.

The need for a "head tax" or passenger facility charge should also be considered in developing airport financing recommendations. In order for Bay Area airports to meet future demands, improved ground transportation facilities will be required. Also, to provide greater community compatibility, airports may be required to initiate major residential sound treatment programs. There are no direct sources of funds for such programs. A "passenger facility charge" would produce a direct user based fee to help finance these programs. At Oakland and San Jose Airports, revenues from such a charge could also be used to augment local matching funds for Federal grants (it should be noted that the "head tax" has been prohibited by Congress since 1973 and would therefore require congressional approval).

- **Institutions** - One of the key areas requiring further regional review is the potential for affecting institutional changes in the way the Bay Area airports are managed and operated. While there are certainly a number of key economic and proprietary questions that should be carefully studied, a regional approach to managing air traffic demand, coordinating the development of new airline service and expanding facilities at the major Bay Area airports should be evaluated and implemented if feasible. Attention should be directed at concepts that a) build on existing institutional arrangements, b) are not discriminatory or anti-competitive, c) do not burden interstate commerce, d) generally support the spirit and intent of the Airline Deregulation Act, and e) have support from local Bay Area communities.
- **Other Proposals** - The Regional Airport Planning Committee has also adopted a series of proposals to foster a more efficient and environmentally acceptable airport system. These proposals are summarized in Table III-2. They are more specific in nature than the recommendations; however, a number of the proposals require additional review and analysis.

Table III-2

SUMMARY OF PROPOSALS

PROPOSALS	TIME FRAME*			LEAD AGENCY	REGIONAL ROLE	COMMENTS
	S	M	L			
<u>FORECASTS/DATA</u>						
1. Review forecasts.	●	●	●	RAPC	Review forecasts.	Regional forecasts should be reviewed every two years. Incremental adjustments should be made considering current regional population, employment and income projections, local and national economic trends, air fares, regulatory changes, and energy availability.
2. Conduct Air Passenger Survey.	●	●	●	RAPC	Design & manage survey.	Data on passenger origins/destinations, ground access patterns, etc., should be updated every five years.
3. Develop consistency in monthly Activity Reports.	●			RAPC	Suggest changes.	Airports should review format for reporting monthly passenger, cargo, and flight statistics to develop consistent reporting format.
<u>AIRPORT SYSTEM ALTERNATIVES</u>						
1. North Bay - Conduct cooperative study with local jurisdictions to develop recommendations for serving future North Bay passenger demand.	●			RAPC	Determine interest. Develop work scope. Manage study.	Existing policy calls for cooperative study addressing a range of issues. (Comparative data on effect of North Bay airport on regional plan developed as part of plan update study.)
2. Evaluate methods to coordinate operation of airports as a regional system.	●			RAPC	Determine interest. Develop work scope. Manage study.	Study would evaluate operational and institutional methods for integrating Bay Area airports. Operational methods include helicopter, STOL, watercraft, bus or fixed guideway transit system. Institutional methods include combined airport management, flight allocation committee, airport pricing committee, etc.
*S = Short-range (0-5 years)						
M = Medium-range (5-10 years)						
L = Long-range (10-20 years)						

Table III-2 (Con't)

SUMMARY OF PROPOSALS

PROPOSALS	TIME FRAME			LEAD AGENCY	REGIONAL ROLE	COMMENTS
	S	M	L			
3. Evaluate second Oakland runway and alternatives.	●			RAPC, BCDC	Evaluate alternatives.	A long-range issue remains concerning the need for a second runway in the Bay and alternatives to its construction.
<u>AIRPORT AND AIRSPACE CAPACITY</u>						
1. Evaluate potential for rescheduling flights.	●			FAA Airlines	Evaluate system impact from rescheduling.	When delays start to regularly approach acceptable limits, encourage airlines to cooperate in voluntary rescheduling of peak period flights.
2. Establish quota rule for SFO (FAR 93) and/or peak period surcharges.	●			FAA Airport		When delays start to regularly exceed acceptable limits, establish a quota for critical traffic periods at SFO or establish surcharges to encourage more rational use of capacity.
3. Segregate general aviation and commuter airline traffic at air carrier airports.	●			FAA		Evaluate potential for using separate airfield facilities and air traffic control procedures for general aviation and commuter airline traffic.
4. Develop "Reliever" general aviation airports that can be used during peak IFR demand periods.	●			FAA Airports	Approve funding.	To provide maximum benefit to the system, reliever airports should have an instrument approach and full ILS if possible.
5. Develop General Aviation ILS training capability.	●			FAA	A-95 review.	Installation of ILS at one or more airports, e.g., Livermore, Hollister, Tracy or Napa, could help satisfy ILS training demand in region and relieve air carrier airports.

Table III-2 (Con't)

SUMMARY OF PROPOSALS

PROPOSALS	TIME FRAME			LEAD AGENCY	REGIONAL ROLE	COMMENTS
	S	M	L			
6. Construct airfield improvements to reduce delays.	●	●	●	Airports	Approve funding.	Proposed projects to reduce delay should be evaluated for impact on airport capacity, noise, and Bay fill.
7. Establish inter-airport transfer capability (air, water or ground).		●		Airports	Evaluate Transit funding operators sources.	Ability of airlines to land at either OAK or SFO and return passengers and bags quickly to desired terminal would enhance airspace capacity (e.g., during IFR weather).
8. Conduct detailed airspace investigation.	●			FAA	Suggest and support.	Large delays are projected, possibly as early as 1987. Studies should be conducted now by FAA to quantify delays, review impact of new ATC technology and evaluate methods to increase airspace capacity.

AIRPORT GROUND ACCESS

i. Prepare transportation development programs.	●	●	●	Airports	Required for A-95 review.	MTC Resolution 592 makes preparation of such programs a condition for favorable review of major expansion projects. Elements include transit coordination & leadership, transit ridership goals, preferential transit treatment on the airport, ride-sharing, paratransit, transit information, transportation system monitoring, etc.
2. SFO-Review I-380 Collector Ramp Project.		●		Caltrans Airport	Coordinate review.	The construction of I-380 Collector Ramp should be reviewed to determine that the project a) represents the best transportation improvement program on the airport for the money available, and b) does not foreclose any options for preferential facilities for transit/high occupancy vehicles.

Table III-2 (Con't)

SUMMARY OF PROPOSALS

PROPOSALS	TIME FRAME			LEAD AGENCY	REGIONAL ROLE	COMMENTS
	S	M	L			
3. SFO-Preserve options for direct BART service.	●	●		Airport	Evaluate BART extension.	Airport plans for west of Bayshore property should preserve future option for a BART station in this location. (Costs may be prohibitive for BART subway through garage as originally planned.)
4. SFO-Upgrade existing transit connections from BART and SP to airport.	●			SamTrans or BART	Suggest and co-ordinate.	Shuttle bus service similar to Oakland's Air-BART should be considered..
5. Expand area bus service.	●	●	●	Transit operators	Provide transit funds.	As demand increases, transit operators should consider 1) extended area coverage, 2) increased express service, 3) development of remote park-and-fly lots, 4) evaluating local streets for preferential use by airport transit services.
6. SFO-Encourage development of private transit services from remote areas.	●	●	●	Airport		Recognize importance of smaller operators in providing access from remote areas. Provide adequate curbspace and signing.
7. SFO-Open airport to local cab companies.	●			Airport		Opening airport to San Mateo cabs could replace a number of dropoff/pickup trips with single cab trips.
8. OAK-Design and evaluate BART connector system.	●	●		Airport	Approve funds.	Convenient connection to BART will enhance regional role of airport and improve ground access to OAK. Alternatives to fixed guideway system should also be studied to evaluate potential for staging service improvements and costs.

Table III-2 (Con't)

SUMMARY OF PROPOSALS

PROPOSALS	TIME FRAME			LEAD AGENCY	REGIONAL ROLE	COMMENTS
	S	M	L			
9. OAK-Improve local street access.	●	●		City of Oakland	Coordinate review- Program funds.	Major improvements to Hegenberger Road, 98th, and Davis St. will be needed to meet airport access requirements. Alternative access to the Industrial Park from 66th Ave. should be considered to relieve Hegenberger Rd.
10. OAK-Extend Hegenberger Expressway to I-580.		●		City of Oakland Caltrans	Program funds.	Project would provide improved access to airport from I-580 and to Coliseum and Eastmont shopping center. However, severe neighborhood problems exist.
11. OAK-Expand area transit service.	●	●	●			See 5.
12. SJC-Study extension of proposed light rail system to airport.	●			County Transit District	Review. Program funds.	County currently conducting a detailed alternatives analysis of light rail and other transit technologies as a prerequisite for funding possible County light rail system.
13. SJC-Program freeway interchange improvements.	●			City of San Jose/ Caltrans	Program funds.	Priorities for improvement of freeway interchanges serving airport should be established. High priority projects should be proposed for inclusion in the T.I.P.
14. SJC-Expand area bus service.	●			County Transit District		County plans to expand bus fleet. Improved airport service should be considered, including connection to BART.
15. SJC-Upgrade bus service to SFO/OAK.	●			Transit operators		Possible limits on SJC growth will increase transit demand to SFO/OAK.

Table III-2 (Con't)

SUMMARY OF PROPOSALS

PROPOSALS	S TIME FRAME M L	LEAD AGENCY	REGIONAL ROLE	COMMENTS
16. Revise ADAP legislation to make airport access projects eligible.	●	RAPC	Review new ADAP legislation. Coordinate local response.	Transit and highway projects that primarily serve airport users should be eligible for aviation trust funds.
<u>AIRPORT NOISE</u>				
1. Prepare noise abatement programs.	● ● ●	Airport	Required for A-95 review. Request conditions on ADAP grant if necessary.	MTC/ABAG resolutions make preparation of such programs a condition for favorable review of major expansion projects. Regional agencies are also interested in evidence that noise trends are consistent with those projected in regional plan and that airports have, in cooperation with local jurisdictions, developed a plan for reducing incompatible land uses.
2. Adopt future noise allocations for airports.	●	RAPC	Review with airports.	Allocations are intended to a) establish goal for region and airports, b) guide future regional decisions, and c) provide airport operators flexibility in working out individual strategies. Allocations would be based on airport traffic distribution in regional plan.
3. Support legislation to ensure compliance with federal schedule for retrofitting, re-engineering, and replacing all non-Part 36 aircraft by January 1, 1985.	● ●	RAPC	Review legislation. Coordinate local response.	RAPC should support legislation that: 1) proposes user generated fees, if necessary, to finance compliance; 2) does not permit substantive deviation from Jan. 1, 1985 compliance date; 3) does not prohibit application of new technology to aircraft produced before availability of technology.

Table III-2 (Con't)

SUMMARY OF PROPOSALS

PROPOSALS	TIME FRAME			LEAD AGENCY	REGIONAL ROLE	COMMENTS
	S	M	L			
4. SFO-Implement Land Use Study recommendations.	●	●	●	Airport	Review and comment.	Major strategies being considered include: ● maximum aircraft noise levels by time of day ● noise quota system ● noise pricing system ● revised preferential runway system ● revised flight procedures ● new noise abatement runways
5. OAK-Review flight tracks over Alameda. Initiate actions to solve future land use compatibility problems on Bay Farm Island.	●	●		Airport FAA	Suggest action.	If noise begins to intrude on northern Alameda, FAA should consider reconfiguration of College 6 flight track. Greater use of Silent 1 between 7p.m. and 10p.m., where practical and safe, could help reduce noise on Bay Farm Island.
6. SJC-Implement airline/airport use agreement to control airport noise levels. Continue land acquisition program.	●	●	●	Airport Airlines	Approve ADAP funds for land acquisition program.	Agreement establishes right of City to regulate hours of airport operation. Airport should also consider incentives for airlines to use newest technology equipment and to reduce number of "fill up" flights also serving SFO/OAK.
7. North Bay-Review land use decisions affecting North Bay airports.	●			RAPC	A-95 review.	Land uses around Hamilton, Napa County, Sonoma County, and Travis airports should be retained in uses compatible with limited air carrier operations until recommendations are made from joint North Bay Study.
8. Prepare Airport Land Use Compatibility Studies.	●	●	●	Airport	Review and comment.	Remedial programs to acquire, insulate, or offer voluntary relocation assistance to home owners should be reviewed with respect to projected noise levels in regional plan. Short term emphasis should be on 70 CNEL area for 1981.

Table III-2 (Con't)

SUMMARY OF PROPOSALS

PROPOSALS	TIME FRAME			LEAD AGENCY	REGIONAL ROLE	COMMENTS
	S	M	L			
9. Review ALUC plans and plans for major residential development.	●	●	●	RAPC	Review and comment.	ALUC plans and plans for major development should be reviewed for consistency with the regional plan in order to a) prevent an increase in incompatible use and b) facilitate a decrease in existing incompatible uses.
10. Support revised ALUC legislation.	●			RAPC	Propose new legislation. Coordinate local response.	RAPC should support legislation that: 1) recognizes state and regional plans in establishing noise impact boundaries; 2) provides mechanism for achieving consistency between ALUC and local plans; 3) provides mechanism for dealing with existing incompatible uses; 4) provides a linkage for sharing mitigation responsibility between airport and local communities.
11. Prepare quarterly noise maps/ Expand monitoring locations.	●			Airports	Update noise maps if not done by airports. Comment on proposed variances.	Airports should consider acquiring computer software to generate quarterly noise maps based on monitoring data. This capability would help to better identify the noise impact boundary and to evaluate potential mitigation measures. Additional monitors should be considered.
12. Assist in reviewing proposed flight track changes.	●	●	●	RAPC	Coordinate local resolution of issues.	When proposed flight pattern changes at one airport shift noise from one community to another, RAPC may be able to assist in resolution of conflict.
<u>AIR QUALITY</u>						
1. Prepare air quality improvement program.	●	●	●	Airports	Required for A-95 review.	MTC/ABAG resolutions have requested such programs be prepared when there is evidence that existing or projected air qual-

Table III-2 (Con't)

SUMMARY OF PROPOSALS

PROPOSALS	TIME FRAME			LEAD AGENCY	REGIONAL ROLE	COMMENTS
	S	M	L			
						ity conditions exceed State and Federal standards.
2. Reduce emission rates for aircraft engines.	●	●		EPA	Support changes in regulations.	Proposed changes by EPA to aircraft engine emission standards would significantly lower emissions. Engine manufacturers must produce the technology.
3. Increase use of mass transit and shared-ride programs.	●	●	●	Transit operators/ Airports		See "Airport Ground Access."
4. Improve vehicular traffic controls on the airport.	●			Airports		Controls to speed the flow of surface traffic on the airports can help reduce emissions.
5. Investigate aircraft towing and partial engine shutdown to reduce ground based emissions.	●	●		Airports		Improvements in aircraft engine emission rates should reduce severe aircraft-related air quality problems. Aircraft towing and partial engine shutdown should be investigated in the future if projected improvements do not materialize.
<u>ENERGY</u>						
1. Maintain high airline load factors.	●	●	●	Airlines		Sustained load factors above 60% are believed possible under airline deregulation.
2. Establish inter-airport transfer capability (air, water, or ground).	●			Transit operators	Suggest methods.	Airport transfer capability would mitigate against low load factors as new flights are added to OAK and SJC.
3. Reschedule operations during peak delay periods.	●	●	●	Airlines	Investigate scheduling impacts.	Voluntary rescheduling by airlines will reduce fuel consumption caused by delays at peak activity periods.

Table III-2 (Con't)

PROPOSALS	TIME FRAME			LEAD AGENCY	REGIONAL ROLE	COMMENTS
	S	M	L			
4. Reduce intra-bay operations.	●			Airlines		Fill-up operations between airports are not energy-efficient.
5. Increase use of mass transit and ride-sharing programs.	●	●	●	Transit operators Airports	Evaluate transit productivity.	Transit operators need to plan improvements so that increased service is not counterproductive by lowering vehicle occupancy.

GENERAL AVIATION AIRPORTS

IV. INTRODUCTION

Background

General aviation is the predominant user of airports and airspace in the Bay Area. The current study is the first major attempt to develop a comprehensive system plan for general aviation airports. The general aviation plan addresses the existing and future role of each airport, makes recommendations for new facilities, and discusses the relationship between proposed improvements and local plans and policies. The general aviation system plan is part of the Airport Element of the Metropolitan Transportation Commission's Regional Transportation Plan and the Association of Bay Area Government's Regional Plan.

Reasons for Revising the Plan

The plan needs to be revised because it contains inadequate information concerning:

- general aviation "needs."
- changing conditions affecting the character and growth in general aviation activity.
- the interrelationships between air carrier and general aviation activity, particularly with respect to the use of airspace.
- review criteria for addressing general aviation issues as they relate to individual airports and airport improvement projects.
- the increasing regional role in programming airport development funds for general aviation airports.

One of the principal issues addressed in the earlier Regional Airport System Study (RASS) was the adequacy of general aviation system capacity to meet projected demand. Demand (aircraft owners) was allocated to general aviation airports after taking into account planned improvements in airfield capacity. In order to replace some privately owned airports expected to close and to serve new demand in the region, it was recommended that eleven new airports would be needed.

Recommendations as to the number and location of new airports were later deleted from the Regional Transportation Plan pending the outcome of this study. Improvements to existing general aviation airports meeting criteria for "regional significance" have been approved on a continuing basis in order to protect and enhance the transportation role of these facilities.

What Will the Plan be Used For?

The plan provides the policy by which ABAG and MTC make decisions in the following areas:

1. Conformance of Local Plans and Projects with the Regional Airport Plan.
 - Airport Master Plans
 - Airport Land Use Commission Plans
 - Local Government General Plans
 - Airport Development Projects
 - Off Airport Land Use Proposals
2. Federal, State, and Local Actions Affecting General Aviation
 - Transportation Improvement Program (T.I.P.)
 - Airspace Rules and Procedures
 - Airport Restrictions
 - Fuel Allocation Programs
3. State and Federal Legislation Affecting Airport Planning
 - Airport and Airway Development Act
 - California Aid to Airports Program
 - Joint Use of Military Airports

V. FINDINGS

General aviation is one of several specialized transportation modes considered in the regional plan. The region's general aviation airports provide terminals for the transfer of passengers and cargo carried on business and personal flights. General aviation supplements existing modes of intercity transportation such as scheduled airline service, bus, rail, and the personal auto by providing air access to a number of locations that would be difficult or more time-consuming to reach by other means. This aspect of general aviation is a serious consideration in the regional plan, while the recreational aspect is of lesser importance. (The need for pilot training should not be confused with recreational flying.)

A historical problem for general aviation has been that of identity. The role that general aviation plays in the regional and national transportation network is not well understood, so it is sometimes hard to convince local governments to support projects that improve general aviation facilities. Local issues usually concern the economic benefits of a general aviation airport, noise from training flights, the possible use of airports by corporate jet aircraft, airport safety, vehicular traffic, and land use proposals off the airport. A regional level of interest seems necessary when the following factors are considered:

- a character of use that indicates travel from other parts of the region, the State and the U.S.
- a level of activity that indicates an important use of the region's airspace.
- a need to relieve activity at congested air carrier airports.
- a substantial use of airports by pilots who reside, or whose aircraft is kept, outside the political jurisdictions of the airport owner.
- a significant investment of public resources.
- instances where noise from aircraft operations affects adjacent communities.

Transportation Function

With respect to its transportation use, an MTC general aviation user survey conducted in 1976 found that 28% of the aircraft surveyed originated outside the MTC region. Statistics gathered by the general aviation industry show that one third of all intercity business trips are made in general aviation aircraft. The trend towards increased use of general aviation by business is closely related to other trends such as the growing dispersal of industrial plants and a contracting airline route system. Commuter airline service, an activity usually associated

with general aviation aircraft, is also becoming more important in the air transportation system. Commuter airlines will provide "essential air service" for communities that are losing service by large carriers under the freedom of entry and exit provisions of the Airline Deregulation Act.

Finally, at the personal transportation level, general aviation competes with the private car as a mode of intercity transportation. While not as energy-efficient as a bus or compact car, some aircraft are equal in efficiency to current mid-sized automobiles and have a significant travel time advantage.

Existing System

The existing regional general aviation airport system is defined to consist of 17 publicly owned airports and 11 privately owned airports. (See Figure V-1) A number of other airstrips exist but are not included in the regional plan because of the low level of activity. In 1978 there were approximately 5850 aircraft located in the region, 87% of which were accommodated at the publicly owned and operated airports. These aircraft made over 4 million takeoffs and landings. Eleven airports have FAA operated control towers; however, only two are currently equipped with a precision Instrument Landing System for exclusive use by general aviation aircraft. About 55% of all takeoffs and landings are made in the local traffic areas and are primarily training flights.

Demand Forecasts

It is difficult to measure demand in a way that directly addresses the functional role performed by general aviation in the regional transportation system. The most pertinent questions would be, "How many people need to fly from here to there?" "How much recreational flying will take place?" and "How much system capacity should be reserved for flight training?" Because these questions are very difficult to answer, demand is usually estimated in terms of the number of aircraft "based" in the Bay Area (i.e., parked at Bay Area airports).

In order to develop general aviation forecasts, a number of factors were reviewed, including population and employment growth in the region, the availability of airport facilities, the costs of aircraft ownership, the growing role of general aviation as a business tool, and the supply of fuel. Limitations in the data and in analytical methods constrained the use of many of these variables in an explicit formula for estimating aircraft ownership. It is also believed that the current shortage of aircraft parking space in the Bay Area probably obscures the true demand for general aviation facilities. The regional forecasts rely principally on population growth and secondarily on judgment in estimating future ownership trends. The "baseline" estimates indicate the potential based aircraft population in the Bay Area would be approximately 7400 aircraft in 1987 and 9600 aircraft in 1997 compared to about 5400 aircraft in 1977. (See Figure V-2)

Figure V-1

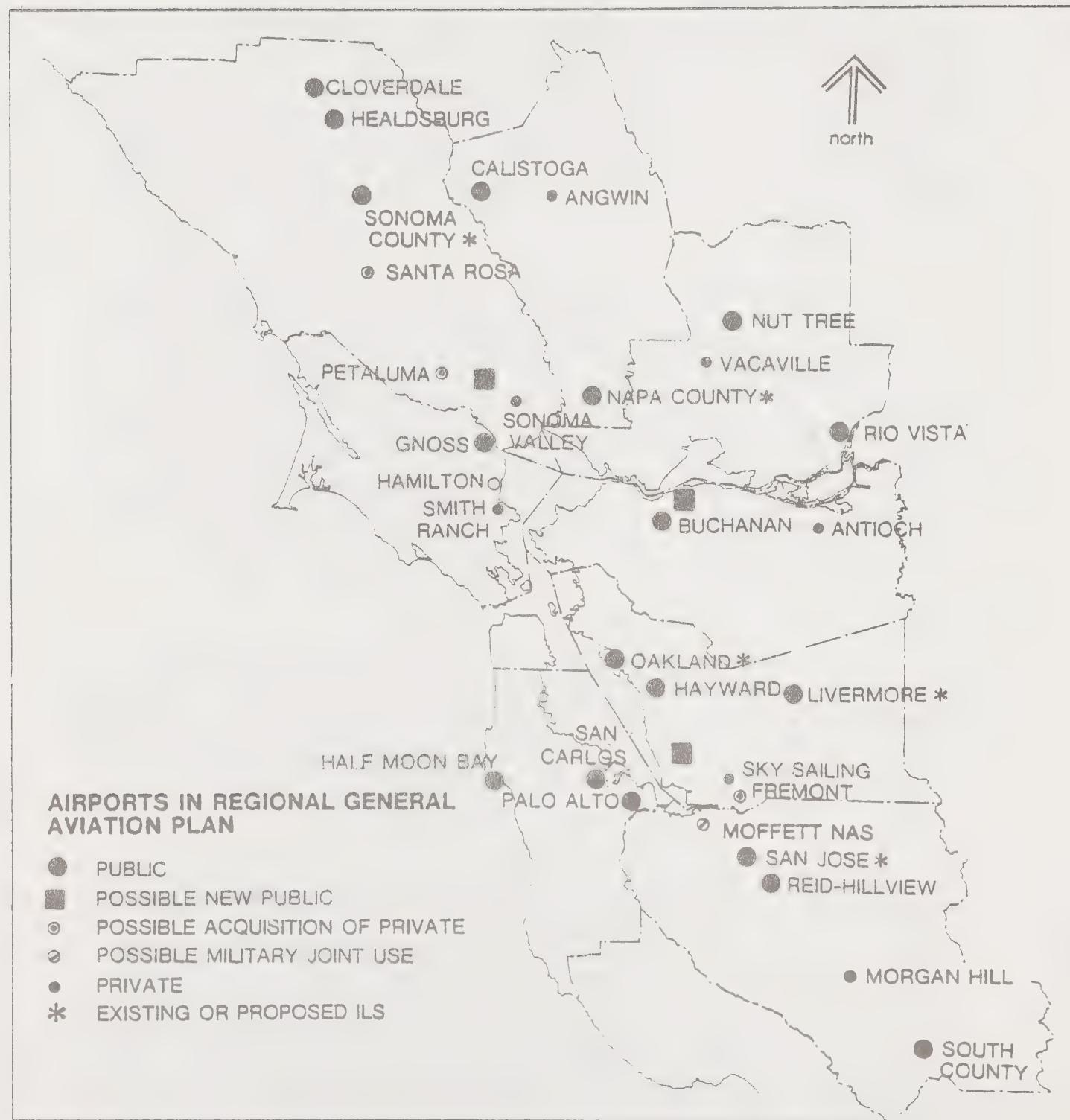
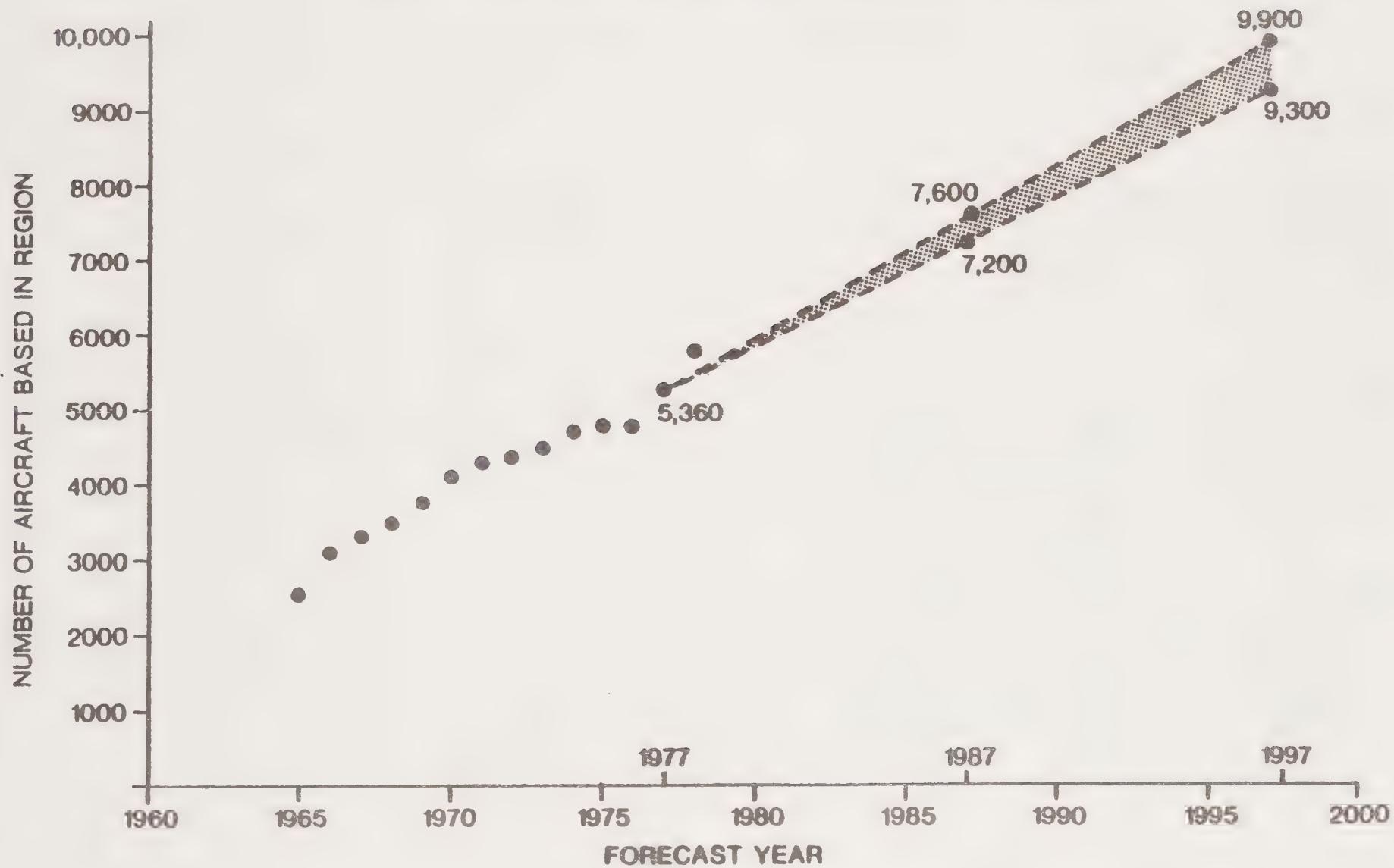


Figure V-2

PROJECTED GENERAL AVIATION AIRCRAFT IN REGION



There is a strong interdependence among local jurisdictions, each using the airports and airspace of others. Another important forecast, therefore, is the estimate of aircraft owner locations in the region. These estimates were prepared at the county level as well as by "440" zone and were used in evaluating alternative general aviation system plans.

Capacity Problems

Two measures of capacity are of concern: aircraft parking capacity and airport runway capacity. Analysis of capacity at the major general aviation airports shows the following conditions.

EXISTING AIRPORT UTILIZATION

<u>County</u>	<u>Airport</u>	Percentage of Capacity	
		Parking	Runway
Alameda	Hayward	100%	90%
	Livermore	100	103
	Oakland	100	60
Contra Costa	Buchanan	100	77
Marin	Gnoss	100	97
Napa	Napa	68	71
San Mateo	Half Moon Bay	67	41
	San Carlos	100	112
Santa Clara	Palo Alto	100	110
	Reid-Hillview	100	82
	San Jose	100	62
	South County	50	21
Solano	Nut Tree	68	57
Sonoma	Sonoma County	100	82

Aircraft parking space is essentially filled at 10 airports in the region. At least 5 airports are close to the theoretical capacity of their runways. Because undeveloped land is available at most airports, it will be possible to increase aircraft parking capacity in the region; however, construction of additional runways is more constrained.

The major changes that might occur in the system include the following:

POTENTIAL CHANGES IN REGIONAL AIRPORT SYSTEM

<u>Possible New Runways</u>	<u>Possible New Public Airports</u>	<u>Possible Closures</u>	<u>Possible Joint Use</u>
<ul style="list-style-type: none"> ● Gnooss Field ● Livermore ● Palo Alto ● South County ● Sonoma County 	<ul style="list-style-type: none"> ● Alameda County (Fremont Area) ● Contra Costa County ● Marin County (Hamilton) ● Sonoma County (Petaluma, Santa Rosa, or new airport) 	<ul style="list-style-type: none"> ● Antioch ● Fremont ● Sky Sailing ● Morgan Hill ● Santa Rosa Air Center ● Smith Ranch ● Sonoma Skypark ● Vacaville 	<ul style="list-style-type: none"> ● Moffett Field

If all the current Master Plan recommendations were completed, the airport system could ultimately accommodate 9800 based aircraft and would have a cumulative runway capacity of 8.3 million annual operations. While this represents a large growth in capacity, not all of the capacity would be available for use because of the location of the airports with respect to the users of the system.

Airspace Capacity

General aviation makes over ten times as many operations as the major airlines and is the principal user of Bay Area airspace. More and more general aviation aircraft are being equipped with navigation equipment to operate in Instrument Flight Rules (IFR) weather.

A 1977 MTC airspace survey found that 18% of the instrument operations conducted in the central Bay Area airspace were made by general aviation aircraft. One concern in the regional plan is to ensure that adequate Instrument Landing System (ILS) facilities are available at general aviation airports in order to relieve traffic from the major air carrier runways. The location of new ILS facilities is also critical since excessive airspace interaction between two or more airports can actually limit airspace capacity.

Under Visual Flight Rules (VFR), aircraft operate on a "see-and-avoid" basis. VFR traffic is already heavily channelized due to the presence of the Terminal Control Area, local terrain, and airport traffic areas. General aviation plans need to consider the impact of added aircraft and runways in areas that are or will be heavily used by VFR aircraft. Also, it is important to review the areas and altitudes used for flight training as some areas are used by air carrier aircraft as well. These areas should be evaluated as to their ability to accommodate both types of activity.

Environment

Airport noise conditions vary among airports and locations. Urban airports such as Reid-Hillview, San Jose Municipal, Hayward, Oakland and Buchanan have or are developing procedures to minimize the impact of noise from training and business jet aircraft. The regional plan can recommend new facilities to handle training flights and can also recommend the purchase of "approach areas" off the airport to prevent future residential encroachment.

The analysis of Bay Area air quality has shown that general aviation's contribution to regional oxidant problems is not significant. Also, with the exception of San Jose Airport, local carbon monoxide concentrations around general aviation airports fail to show any exceedances of State and Federal standards.

Expansion of existing general aviation airports or development of new general aviation airports on the perimeter of the Bay or near major "wetland" areas will need to be reviewed with respect to Federal, State, and local plans for these environmentally sensitive areas.

Airport Financing

Funding will be a major constraint in the implementation of regional and local general aviation plans. Costs of labor and materials and land values are expected to escalate above historic rates, limiting the ability of airports to finance proposed improvements. There will probably be a shortage of local money to match Federal and State funds since most airport improvement projects must compete with other demands on shrinking general funds. The exception to this is when an airport has established an "enterprise" fund, that is a separate sinking fund to finance capital improvements.

Regional planning and programming are brought together in the preparation of the five year Transportation Improvement Program (T.I.P.). Airport and project priorities are established and matched to the funds available; this program is reviewed every year and constitutes the short range program for the general aviation system plan. The Regional Transportation Improvement Program includes approximately \$33 million in current dollars for improvements to general aviation airports.

Recommended Plan

The recommended plan provides a staged program for improving the Bay Area general aviation airports. The plan establishes a high priority for maintaining and improving existing publicly owned airports and for acquiring sufficient property to protect these airports from future residential encroachment. The plan recommends a moderate expansion in airport system capacity including the development of three new airports to provide training relief and increase aircraft storage capacity. (Two of the potential sites are existing private airports.) The plan also provides mechanisms for relieving general aviation traffic at the busy air carrier airports by improving "reliever" airports and providing

exclusive ILS (Instrument Landing Systems) for use by general aviation aircraft. Finally, the plan considers the consistency of the recommendations with local plans and policies and identifies areas of regional concern to be addressed in submitting future requests for airport development funds.

REGIONAL PLAN RECOMMENDATIONS

<u>Year</u>	<u>Demand[1]</u>	<u>Proposed Parking Capacity[1]</u>	<u>Proposed Runway Capacity[2]</u>	<u>Estimated Annual Operations[3]</u>
1977	5,360	6,200	7,155,000	4,000,000
1987	7,400	7,640	8,270,000	5,431,000
1997	9,600	9,100	8,270,000	6,743,000

Notes:

1. Number of aircraft.
2. Number of annual aircraft operations that could be handled.
3. Number of estimated takeoffs and landings based on proposed improvements.

VI. POLICIES AND RECOMMENDATIONS

Goal: To develop a General Aviation System Plan for the region.

Objectives

- 1.1 The plan shall include those general aviation airports that are considered important to the regional system.
- 1.2 The plan shall identify the role of each existing and planned airport in the recommended regional system.
- 1.3 The plan shall contain a staged program for development of each airport.
- 1.4 Where recommendations are different from those in local plans and airport master plans, the plan shall identify issues of overriding regional significance.
- 1.5 The plan shall consider possible constraints on the development of the general aviation system including but not limited to, airspace capacity, noise, air quality, and impact on Bay waters and wetlands.
- 1.6 The plan shall identify issues that require cooperation among local governments and among local governments and the region.
- 1.7 The plan shall contain generalized project review concerns to provide guidance to airport operators when submitting projects for regional review under OMB Circular A-95 and under California Government Code Sec. 66520.
- 1.8 The plan shall be submitted to the State and shall represent the region's input to the California Airport System Plan. The plan shall also be used to amend and revise the National Airport System Plan.

Policies

- 1.1 Every effort shall be made to maintain the capability of the general aviation system to provide essential transportation services.
- 1.2 A high priority shall be attached to preserving, maintaining, and improving existing publicly owned general aviation airports in the region.
- 1.3 Development of new publicly owned airports shall be approved if such airports are a) consistent with the regional plan, b) consistent with local plans and policies, and c) are protected by adequate long range zoning controls for surrounding land uses.

- 1.4 Development of new airports or expansion of existing facilities shall not be recommended if such actions would seriously compromise airspace safety or efficiency.
- 1.5 In order to promote airspace safety and efficiency, adequate VFR and IFR training facilities shall be developed for exclusive use by general aviation. VFR training areas should be regulated to the extent required to prevent conflict with air carrier and military operations.
- 1.6 Airport operators shall make every effort to be a "good neighbor" and implement flight procedures that minimize the impact of aircraft operations on local communities.
- 1.7 Local plans and policies should recognize the importance of general aviation airports and provide adequate zoning protection.
- 1.8 Projects involving major airport expansion or major changes in the use of a facility that are submitted for regional review under OMB Circular A-95 or California Government Code Sec. 66520 shall address the "regional concerns" outlined in the general aviation plan.
- 1.9 Where local plans call for aircraft parking development in excess of levels shown in the regional plan, regional review of these projects shall pay particular attention to a) airspace interactions, b) community noise impacts, and c) methods to manage demand consistent with available runway capacity (e.g. development of reliever training airports or "bounce" strips, restrictions on training activity, relocation of flight training schools).
- 1.10 Projects submitted for Federal or State funding shall be included in an approved Airport Master Plan or Airport Layout Plan.
- 1.11 The adopted Regional Transportation Improvement Program, as it is annually reviewed and revised, shall be the basis for programming general aviation airport improvement funds in the region.
- 1.12 The region supports the development of user fees for improvements to general aviation airports.
- 1.13 General aviation airport plans shall consider the need for commuter airline facilities and services.
- 1.14 Possible future Short Takeoff and Landing aircraft (STOL) operations at general aviation airports would not normally be considered consistent with the plan unless the airport operator owns in fee simple the maximum approach area recommended in FAA standards for the appropriate runway instrumentation category.

Recommended Plan

The recommended general aviation plan is shown in Table VI-1 and accomplishes the following objectives:

- Provides an increase in system capacity but does not serve all of the projected long range demand.
- Maximizes the use of existing facilities, with particular emphasis on upgrading airports that relieve the congestion at air carrier airports. The recommended plan recognizes the inherent cost and operational efficiencies that result from the incremental expansion of existing facilities. Expansion of existing facilities is also the most productive way to increase system capacity over the short term, since planning and development of new airports can take many years. Existing airports are usually close to major population centers and are therefore the most convenient for the users.
- Recognizes the potential for three new airports in Contra Costa, Alameda, and Sonoma Counties, two of which may be provided through acquisition of existing private airports.
- Minimizes airspace interactions by locating major new capacity away from congested airspace. The recommended plan would produce a modest increase in activity at airports that rim the Bay; however, the most significant increases in system capacity would occur at more remote sites such as South County, Livermore, Sonoma County, Gnoss Field, Nut Tree, and potential new airports in Contra Costa and Sonoma Counties.
- Explicitly considers the need for adequate training facilities--both VFR and IFR. IFR training relief for San Jose would be provided by installation of a full Instrument Landing System (ILS) at Livermore Airport. The critical lack of training capacity in the South Bay would be solved in the short term by exploring joint use of Moffett Field NAS with the Navy, and in the long term by new runways at Fremont (preferred) or Palo Alto. The recommended development of a new airport in Contra Costa County would relieve training activity at Buchanan.
- Considers Regional and Local Plans and Policies. The general aviation plan recognizes the recommendations developed through FAA-sponsored airport master planning studies and incorporates these recommendations in the plan as appropriate. The general aviation plan further recognizes the preparation of the Baylands Master Plan by the City of Palo Alto and the Bay Plan developed by the Bay Conservation and Development Commission (BCDC).
- Continues the program priorities established in the five year Regional Transportation Improvement Program (T.I.P.). These priorities reflect the following major programming goals for federal and state airport development funds.

- a) Improve safety of existing airports.
 - b) Maintain facilities at existing airports.
 - c) Improve efficiency of existing airports.
 - d) Protect existing airports from future encroachment and minimize adverse environmental impacts.
 - e) Acquire land now to meet future airport needs.
 - f) Expand aircraft parking space to meet existing and future requirements.
 - g) Construct new runways to provide additional capacity and reduce runway congestion.
- Identifies areas of regional interest in project review. Table VI-1 indicates those areas that the region is likely to be concerned with based on the analysis conducted for this study. This table is intended to serve as a general guide to sponsors in submitting projects for A-95 review.
 - a) Airspace--indicates interactions with other airports or growing congestion in channelized traffic routes adjacent to these airports.
 - b) Noise--indicates need to review impact of increased operations on surrounding communities.
 - c) Air quality--generally carbon monoxide, and indicates the airport is in an area where attainment of ambient air quality standards may be difficult.
 - d) Bay--indicates need to review issues related to Bay fill or the Bay habitat, including wetland areas.
 - e) Land Use--indicates concern with existing or proposed land use around airports.
 - f) Coordination--indicates need to coordinate with other jurisdictions.

Specific areas of concern will be discussed with the airport sponsor prior to preparation of major project funding applications. Major projects are projects that will significantly increase airport capacity or change the character of airport use or projects that have the potential for significant adverse environmental effects.
 - Identifies areas where local policy clarification is required to make the plan more explicit or where additional study is required. The regional plan recommends that:

- a) Sonoma County develop a countywide plan for airport improvements and that the plan include project priorities and costs. The ultimate role of Petaluma Airport and the Santa Rosa Air Center are key issues.
- b) Marin County determine how future general aviation growth will be handled in the county including a comparative study of Gnoss Field and Hamilton Airport.
- c) Santa Clara County update the Master Plans for Palo Alto, Reid-Hillview, and South County Airports and consider potential joint use of Moffett Field NAS in its plans.
- d) MTC work with Fremont, San Jose, and Palo Alto to conduct a Site Selection/Master Plan study for a new airport in the Fremont area.

Table VI-1
SUMMARY OF GENERAL AVIATION PLAN PROPOSALS

Airport	Time Frame	Status	Aircraft Parking ¹	New Runways	Runway Capacity ²	Aircraft Operations ³	NAVAIDS ⁴	Project Review Concerns	Comments
Oakland (Ala 1.1)	S		825		600,000			Airspace	
	M		825			562,000			
	L		900			600,000			
Hayward (Ala 1.2)	S		530		500,000			Airspace, Noise	
	M		600			374,000			
	L		705			500,000			
Livermore (Ala 1.3)	S		400	●	500,000		●	Land Use	Development of South Side yields ultimate parking capacity.
	M		400			285,000			
	L		550			445,000			
Fremont (Ala 1.4)	S	Possible Land Acquisition	90					All	Perform Site Selection/Master Plan Study.
	M		150	○	500,000	333,525	○		
	L		250			423,500			
Fremont Sky Sailing (Ala 1.5)	S	Possible Closure	12		115,000				Gliderport.
	M		12						
	L		12						
Buchanan (CC 1.1)	S		540		485,000			Noise, Land Use	Development of West Side yields ultimate parking capacity.
	M		700			393,000*			
	L		780			440,000*	○		
New Reliever (CC 1.2)	S	New	75	●	250,000			All	Under study.
	M		75			134,000	○		
	L		180	○		250,000			
Antioch (CC 1.3)	S	Possible Closure	70		115,000	46,000		Land Use	Status uncertain pending outcome of County reliever airport study.
	M		*						
	L		*						
Coors (M 1.1)	S		275					Bay	Future role related to decision on Hamilton.
	M		330	○	370,000	272,000			
	L		445			370,000			

Notes:

1) Excludes Transient Parking

2) Annual Service Volume-Assumes Increased Utilization

3) Annual Takeoffs and Landings

4) Navigational Aids

S = Short (0-5 years)

M = Medium (5-10 years)

L = Long (10-20 years)

● ILS or New Runway

○ Possible ILS or New Runway

* Assumes diversion of some training

Table VI-1 (Cont'd)
SUMMARY OF GENERAL AVIATION PLAN PROPOSALS

<u>Airport</u>	<u>Time Frame</u>	<u>Status</u>	<u>Aircraft Parking¹</u>	<u>New Runways</u>	<u>Runway Capacity²</u>	<u>Aircraft Operations³</u>	<u>NAVAIDS⁴</u>	<u>Project Review Concerns</u>	<u>Comments</u>
Hamilton (M 1.2)	S	Surplus Military	350	○	250,000	328,000	○	Airspace, Land Use	"Proposals" reflect role of Hamilton as replacement for Gnoss and Smith Ranch.
	M		410		400,000				
	L		500			400,000			
Smith Ranch (M 1.3)	S	Possible Closure	75		115,000	48,600	●		
	M		75						
	L		75						
Napa Co. (N 1.1)	S		230		490,000	398,000	●		
	M		280						
	L		380			377,000			
Angwin (N 1.2)	S		25		145,000	16,000			
	M		25						
	L		25						
Calistoga (N 1.3)	S	Possible Closure	12		145,000		●		Gliderport.
	M		12						
	L		12						
San Carlos (SM 1.1)	S		490		270,000	245,000*	●	Bay	Runway extension proposed in regional plan.
	M		490						
	L		490			245,000*			
Half Moon Bay (SM 1.2)	S		100		180,000	180,000	●	Land Use	
	M		150						
	L		150			180,000			
Palo Alto (SC 1.1)	S		510	○	265,000	240,000*	●	Coordination (City of Palo Alto)	Second runway least preferred alternative for providing training capacity in South Bay.
	M		510						
	L		510			240,000*			
Reid-Hillview	S		730		500,000	387,000	●		
	M		730						
	L		730			387,000			

Notes:

- 1) Excludes Transient Parking
- 2) Annual Service Volume-Assumes Increased Utilization
- 3) Annual Takeoffs and Landings
- 4) Navigational Aids

S = Short (0-5 years)
 M = Medium (5-10 years)
 L = Long (10-20 years)

● ILS or New Runway
 ○ Possible ILS or New Runway
 * Assumes diversion of some training

Table VI-1 (Cont'd)
SUMMARY OF GENERAL AVIATION PLAN PROPOSALS

<u>Airport</u>	<u>Time Frame</u>	<u>Status</u>	<u>Aircraft Parking¹</u>	<u>New Runways</u>	<u>Runway Capacity²</u>	<u>Aircraft Operations³</u>	<u>NAVAIDS⁴</u>	<u>Project Review Concerns</u>	<u>Comments</u>
San Jose Municipal (SC 1.3)	S M L		565 804 804		660,000	450,000* 450,000*		Airspace, Air Quality	Master planning study recommends development of West Side for general aviation.
South County (SC 1.4)	S M L		270 270 500	●	500,000	270,000 500,000	○	Land Use	Major expansion needed to serve County demand.
Moffett Field NAS (SC 1.5)	S M L	Possible Joint Use	None					Airspace, Noise, Land Use	Moffett could be used on interim basis for training relief in South Bay.
Morgan Hill (SC 1.6)	S M L	Probable Closure	45 * *		115,000	29,000			
Nut Tree (Sol 1.1)	S M L		140 170 250		250,000	203,000 250,000		Land Use	Potential residential encroachment on West Side.
Rio Vista (Sol. 1.2)	S M L		60 60 80		145,000	48,000 95,000			City considering relocation of airport.
Vacaville (Sol 1.3)	S M L		10 10 10		115,000				Gliderport.
Sonoma Co. (Son 1.1)	S M L		400 550 770	●	500,000	283,000 400,000		Land Use	Need to protect approach areas.
Santa Rosa (Son 1.2)	S M L	Consider Public Acquisition	250 250 250		115,000			Airspace, Land Use, coordination (region & Sonoma)	Potential new public airport. Conduct Master Plan study to determine feasibility.

Notes:

- 1) Excludes Transient Parking
- 2) Annual Service Volume-Assumes Increased Utilization
- 3) Annual Takeoffs and Landings
- 4) Navigational Aids

S = Short (0-5 years)
M = Medium (5-10 years)
L = Long (10-20 years)

● ILS or New Runway
○ Possible ILS or New Runway
* Assumes diversion of some training

Table VI-1 (Cont'd)
SUMMARY OF GENERAL AVIATION PLAN PROPOSALS

<u>Airport</u>	<u>Time Frame</u>	<u>Status</u>	<u>Aircraft Parking¹</u>	<u>New Runways</u>	<u>Runway Capacity²</u>	<u>Aircraft Operations³</u>	<u>NAVAIDS⁴</u>	<u>Project Review Concerns</u>	<u>Comments</u>
Petaluma (Son 1.3)	S	Consider	70	○	115,000	46,000		Land Use, coordination (region & Sonoma)	Potential new public airport. City plans to acquire and improve existing private airport.
	M	Public	150		250,000	135,000			
	L	Acquisition	250			225,000			
Healdsburg (Son 1.4)	S		60		145,000	75,000			
	M		80			100,000			
	L		110			138,000			
Cloverdale (Son 1.5)	S		12		145,000	15,000			Permit expires in 1980.
	M		30			38,000			
	L		36			45,000			
Sonoma Valley (Son 1.7)	S		100		145,000	65,000		All	Private airport performing a unique role. Airport should be retained.
	M		100						
	L		100						
New Sonoma (Son 1.8)	S		100	○	250,000				Potential new public airport. Earlier study recommended site near Sonoma Skypart, but no action taken.
	M		150						
	L		250						

Notes:

- 1) Excludes Transient Parking
- 2) Annual Service Volume-Assumes Increased Utilization
- 3) Annual Takeoffs and Landings
- 4) Navigational Aids

S = Short (0-5 years)
M = Medium (5-10 years)
L = Long (10-20 years)

● ILS or New Runway
○ Possible ILS or New Runway
* Assumes diversion of some training

APPENDIX

Related Reports

Air Carrier Airports - Final Report

General Aviation Airports - Final Report

Aviation Forecasts and Airport Alternatives

Airport Facilities and Plans

Airfield Capacity

Airspace Capacity

Airport Ground Access Capacity

Airport Noise Impacts

Aviation Impacts on Air Quality

Energy Use

Airport Employment Projections and Impacts

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